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Vol. I

TRANSCRIPT OF RECORD

(Pages 1 to 115)

Supreme Court of the United States

OCTOBER TERM, 1944

No. 189

THE CONNECTICUT LIGHT AND POWER COMPANY, PETITIONER,

vs.

FEDERAL POWER COMMISSION

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

PETITION FOR CERTIORARI FILED JUNE 23, 1944.

CERTIORARI GRANTED OCTOBER 9, 1944.

APPENDIX TO BRIEF FOR PETITIONER.

VOLUME I, pages 1 to 115.

IN THE

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

No. 8341.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

ON PETITION TO REVIEW ORDER OF FEDERAL POWER COMMISSION ENTERED MAY 15, 1942.

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PETITION FOR REVIEW OF ORDER OF FEDERAL POWER COMMISSION ENTERED MAY 15, 1942

IN THE

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

No. 8341.

THE CONNECTICUT LIGHT AND POWER COMPANY, PETITIONER,

v.

FEDERAL POWER COMMISSION, RESPONDENT.

To the Honorable the Justices of the United States Court of Appeals for the District of Columbia:

Petitioner, The Connecticut Light and Power Company, being aggrieved by an Order of the Federal Power Commission, hereinafter called the "Commission", dated May 15, 1942, hereby files in this Court, pursuant to Section 313 of the Federal Power Act, its written petition to this Honorable Court to review said order, and upon such review to set aside and annul or to modify said Order. As a basis for this petition, Petitioner respectfully shows:

I. On January 7, 1941, the Commission entered an Order directing the Petitioner to show cause

> "(1) Why it is not now, and has not been since August 26, 1935, a public utility within the meaning of the Federal Power Act;

(2) Why it has failed or refused to comply with the Commission's Order No. 42, adopted June 16, 1936, and adopt the Uniform System of Accounts prescribed thereby;

(3) Why it has failed to comply with Electric Plant Accounts Instruction 2-D of the Commission's Uniform System of Accounts, and with the Commission's Order adopted May 11, 1937;"

and in relation to certain other matters specified in said Order to Show Cause.

II. On June 6, 1941, Petitioner appeared specially and filed an answer to said Order to Show Cause. Hearings were held before a Trial Examiner of the Commission. The Commission, on May 15, 1942, promulgated its opinion No. 75 containing findings and an order requiring compliance by Petitioner with said Orders mentioned in the above quotation from the Order to Show Cause and compliance with other Orders supplemental to said Order No. 42 and accounting requirements prescribed thereby "applicable to it as a public utility within the meaning of that term as used in that Act", as of the effective dates of such Orders and requiring Petitioner, within ninety days from May 15, 1942, to "file the data and information required by Electric Plant Accounts Instruction 2-D of the Uniform System of Accounts", and the aforesaid Order of May 11, 1937.

III. On June 13, 1942, Petitioner filed with the Commission a Petition for Reopening the Proceedings to Take Further Evidence, and a Petition for Rehearing and Stay of said Order of May 15, 1942. On June 23, 1942, the Commission entered its Order denying the Petition for Reopening the Proceeding to Take Further Evidence and modifying the said Order of May 15, 1942, by granting Petitioner a stay of said Order, if a proceeding for a review of said Order should be commenced, until sixty days after the final judg-

ment and decree of the reviewing Court should become finally effective affirming said Order, and otherwise denying said Petition for Rehearing and Stay of Order.

IV. The questions in the case are whether Petitioner is a "public utility" within the meaning of the Federal Power Act, and whether it has been such a "public utility" at any time since August 26, 1935, and to what extent, if any, it should be required to comply with the aforesaid orders.

V. The Commission held that Petitioner was a "public utility" under the provisions of Section 201 of the Federal Power Act. Paragraph (e) of that section defines a "public utility" as "any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part." Paragraph (b) of that section provides that "the Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce." The term "such transmission or sale" in paragraph (b) refers to the previous sentence in that paragraph, which provides that "the provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy . . ." Paragraph (a) of said section declares that Federal regulation of that part of the business of transmitting and selling electric energy for ultimate distribution to the public "which consists of the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce is necessary in the public inter-

est, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States."

VI. The Petitioner has contended and now contends that

(1) At no time since August 26, 1935, has Petitioner been a "public utility" within the meaning of Part II of the Federal Power Act;

(2) Since February, 1941, or June, 1941, Petitioner has not been a public utility within the meaning of Part II of the Federal Power Act;

(3) At no time since August 26, 1935, has Petitioner owned or operated facilities subject to the jurisdiction of the Commission under Section 201 of said Act;

(4) Since February, 1941, or June, 1941, Petitioner has not owned or operated facilities subject to the jurisdiction of the Commission under Section 201 of said Act;

(5) At no time since August 26, 1935, has Petitioner engaged in business which consists of the transmission of electric energy in interstate commerce or the sale of such energy at wholesale in interstate commerce;

(6) Since February, 1941, or June, 1941, Petitioner has not engaged in business which consists of the transmission of electric energy in interstate commerce or the sale of such energy at wholesale in interstate commerce;

(7) Petitioner has not at any time since August 26, 1935, been subject to the accounting orders and requirements of the Federal Power Commission;

(8) Since February, 1941, or June, 1941, petitioner has not been subject to the accounting orders and requirements of the Commission;

(9) Petitioner's accounting and all of its business and facilities are, and at all times since August 26, 1935, have been subject in all respects to regulation by the State of Connecticut and the Public Utilities Commission of that State.

(10) Petitioner's accounting was at all times prior to April, 1941, subject to regulation of any accounting requirements which the Securities and Exchange Commission desired to promulgate under Section 15 of the Public Utility Holding Company Act of 1935.

VII. The points on which the Petitioner intends to rely are:

(1) The failure of the Commission to furnish the Petitioner with a copy of the Trial Examiner's report, as requested in its Petition for Rehearing filed with the Commission;

(2) The failure of the Commission to allow Petitioner to adduce additional evidence, as requested in its Petition for Reopening the Proceedings to Take Further Evidence;

(3) The failure of the Commission to grant a rehearing to Petitioner, as requested in its Petition for Rehearing filed with the Commission; and

(4) All of those points specified in the extracts from the Petition for Rehearing filed with the Commission which are copied in "Exhibit A" annexed hereto and hereby made a part hereof.

WHEREFORE, Petitioner prays:

(1) That this Court review said Order of the Commission dated May 15, 1942;

(2) That upon such review, this Court set aside and annul said Order in whole; or

(3) That upon such review, this Court modify said Order so as to provide that since February, 1941, or June, 1941, Petitioner has not been a "public utility" within the meaning of said Act or subject to the accounting orders and requirements of the Commission;

(4) That this Court give leave to Petitioner to adduce additional evidence before the Commission;

(5) That a copy of this Petition for Review be served upon a member of the Federal Power Commission, as prescribed by law;

(6) That this Court grant such other and further relief as may be just and proper in the premises.

THE CONNECTICUT LIGHT AND POWER COMPANY,
By its Attorneys,

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EXHIBIT A.

EXTRACTS FROM PETITION FOR REHEARING FILED WITH FEDERAL POWER COMMISSION, SPECIFYING ERRORS NOW RELIED UPON IN PETITION FOR REVIEW BY THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

The Respondent [before the Commission, Petitioner here]* complains that the Commission committed error in these proceedings to the prejudice of the Respondent in entering said Order of May 11, 1937 and in making the findings and reaching the conclusions hereinafter specified and in failing to make findings and rulings of law as hereinafter specified. The Respondent specifies in this petition the following matters claimed to have been erroneously decided or omitted. In support of this application it relies upon all grounds hereinafter set forth.

The Commission erred:

1. In finding that electric energy in substantial amount was purchased by the Borough of Groton or by Fishers Island or that the amount which the Respondent knew was transmitted to Fishers Island was substantial, and in so far as it made other similar findings or rulings with respect to this matter.

2. In finding that the Respondent owned and operated facilities at or near Groton and Montville and between those places "used for the transmission of the electric energy sold to Fishers Island * * * as distinguished from local distribution thereof."

3. In finding that the facilities owned and operated at or near Groton and Montville "were facilities for the transmission and sale at wholesale of electric energy in

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* The Respondent before the Commission is the Petitioner in this Court, and consequently wherever "Respondent" appears in Exhibit A it refers to the Petitioner before this Court.

interstate commerce, and Respondent was, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act", and in so far as it made other similar findings or rulings with respect to this matter.

4. In finding that in the operation of the Connecticut Valley Power Exchange "electric energy which is transmitted from Massachusetts has regularly, frequently, for substantial periods of time, and in substantial amounts been, and continues to be, supplied to The Connecticut Power Company's South Meadow substation and to its C.P. 1 and C.P. 2 lines by means of the C-3 and D-4 lines, substation facilities, and other appurtenant facilities", and in so far as it made other similar findings or rulings with respect to this matter.

5. In finding that the electric energy purchased by the Respondent for its East Hampton District in Connecticut "regularly, frequently, and for substantial periods of time included electric energy in substantial amounts transmitted from Massachusetts", and in so far as it made other similar findings or rulings with respect to this matter.

6. In finding that "from January 1, 1937, to June 30, 1939, both inclusive, the Respondent continuously owned and operated facilities in its East Hampton District and between that district and the aforesaid Pole 110 used for the transmission of electric energy purchased as aforesaid from The Connecticut Power Company, as distinguished from local distribution thereof", and in so far as it made other similar findings or rulings with respect to this matter.

7. In finding that "from January 1, 1937, until June 30, 1939, both inclusive, the Respondent owned and operated facilities in its East Hampton District, and between that district and the aforesaid Pole 110, for the transmission of electric energy, transmitted from the State of Massachu-

setts and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were facilities for the transmission of electric energy in interstate commerce, and Respondent was, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act", and in so far as it made other similar findings or rulings with respect to this matter.

8. In finding that the electric energy purchased by the Respondent for its Winsted District "regularly, frequently and for substantial periods of time included electric energy in substantial amounts transmitted from Massachusetts", and in so far as it made other similar findings or rulings with respect to this matter.

9. In finding that "from January 1, 1937, to June 17, 1941, both inclusive, the Respondent continuously owned and operated facilities in its Winsted District and between that district and the aforesaid 2,300 volt bus of The Torrington Electric Light Company used for the transmission of electric energy purchased, as aforesaid, from The Torrington Electric Light Company, as distinguished from local distribution thereof," and in so far as it made other similar findings or rulings with respect to this matter.

10. In finding that "from January 1, 1937, to June 17, 1941, both inclusive, the Respondent owned and operated facilities in its Winsted District, and between that district and the aforesaid 2,300 volt bus of the Torrington Electric Light Company, for the transmission of electric energy transmitted from the State of Massachusetts and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were facilities for the transmission of electric energy in interstate commerce, and Respondent was, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that

term as used in the Federal Power Act", and in so far as it made other similar findings or rulings with respect to this matter.

11. In finding that the Respondent has purchased and has continued to purchase electricity for its Bristol District which "regularly, frequently, and for substantial periods of time, has included electric energy in substantial amounts transmitted from Massachusetts by means of the aforesaid substation facilities of The Connnecticut Power Company, the C-3, D-4, C.P. 1, C.P. 2, and tap lines, and appurtenant facilities", and in so far as it made other similar findings or rulings with respect to this matter.

12. In finding that "from January 1, 1937, to the present time the Respondent has continuously owned and operated substation facilities in Bristol used for the transmission of electric energy, purchased as aforesaid from The Connecticut Power Company, as distinguished from local distribution thereof", and in so far as it made other similar findings or rulings with respect to this matter.

13. In finding that "from January 1, 1937, to the present time the Respondent has continuously owned and operated and now owns and operates facilities in Bristol, Connecticut, for the transmission of electric energy, transmitted from the State of Massachusetts and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were and are facilities for the transmission of electric energy in interstate commerce and Respondent was and continues to be, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act", and in so far as it made other similar findings or rulings with respect to this matter.

14. In so far as it found or held in its Opinion that on or prior to August 26, 1935, the Respondent did not cut

all connections over which interstate energy flowed over its facilities.

15. In so far as it found or held in its Opinion that the Respondent knew or believed that it was a public utility within the meaning of the Federal Power Act.

16. In so far as it found or held in its Opinion that the Respondent impliedly recognized that it had been subject, or at least that it probably would be held to be subject, to the regulatory provisions of the Act; *i.e.*, that there was interstate energy supplied at any of its interconnections and that it owned or operated facilities for the transmission of that energy.

17. In so far as it found or held in its Opinion that electric energy generated in Massachusetts was supplied to the Respondent for distribution and sale to its customers in Connecticut, sometimes mixed with energy generated in Connecticut and sometimes not mixed.

18. In so far as it found or held in its Opinion that the Respondent owned and operated facilities for "the transmission of interstate energy" and in so far as it made any subsidiary findings or adopted any reasoning in support of this conclusion.

19. In so far as it found or held in its Opinion that the words "facilities for transmission", as used in the Act, include any of the facilities of the Respondent which were held or found to be facilities for transmission of electric energy in interstate commerce, and in so far as it made any subsidiary finding or adopted any reasoning in support of this conclusion.

20. In so far as it found or held that transformers do not bring about such a change in the identity or form of electric energy that they mark the terminus of interstate commerce in electric energy which crosses the state boundary.

21. In so far as it found or held in its Opinion that any transmission of electric energy from points of generation in Massachusetts to points of utilization in the system of the Respondent in Connecticut was demonstrable, and in so far as it made subsidiary findings or adopted reasoning in support of this conclusion, and specifically all of the findings, reasoning and holdings contained in that part of the Opinion beginning with the last paragraph on page 24 of the Opinion with the words "Finally, we notice the contention" and ending before the first full paragraph on page 28 with the words "worthless for the practical purpose of administering the Federal Power Act."

22. In so far as it found or held that there was no excuse for the failure of the Respondent to comply with Order No. 42 and other orders applicable to "public utility" as that term is used in the Federal Power Act.

23. In concluding that the Respondent is a public utility within the meaning of that term as used in Parts II and III of the Federal Power Act and in not concluding the contrary.

24. In concluding that the Respondent has at any time since August 26, 1935, been a public utility within the meaning of that term as used in Parts II and III of the Federal Power Act, and in not concluding the contrary.

25. In so far as it found or held that the Respondent owns or operates any facilities for the transmission of electric energy in interstate commerce or the sale of such energy at wholesale in interstate commerce.

26. In so far as it found or held that the Respondent has at any time since August 26, 1935, owned or operated any facilities for the transmission of electric energy in interstate commerce or the sale of such energy at wholesale in interstate commerce.

27. In so far as it found or held that any facilities owned or operated by the Respondent are used in interstate commerce.

28. In so far as it found or held that any facilities owned or operated by the respondent have been used in interstate commerce at any time since August 26, 1935.

29. In failing to find, as requested:

> "The business of the respondent consists principally of the production, purchase, transmission, distribution, and sale of electricity and gas for residential, commercial, industrial and municipal purposes in the State of Connecticut. The territory served by the company with electricity or gas, or both, covers approximately 3,235 square miles, with a population of about 703,000 based on the 1940 Federal Census, not including the territory served by other Connecticut utilities purchasing substantially all of their requirements from the respondent. Electric service is supplied by the respondent in 107 towns, cities or boroughs of Connecticut with a total population of about 660,000, based on the 1940 Census, not including about 130,000 served by other Connecticut utilities purchasing substantially all of their electric requirements from the respondent. The territory served directly by the respondent covers a substantial part of the State of Connecticut, including the cities of Bristol, Meriden, New Britain, Norwalk, Putnam, Rockville, Waterbury, Willimantic, and Winsted and the town of Greenwich. Electric energy is supplied at wholesale to other utilities. Approximately 80% of the electric energy requirements of the respondent is produced by it, the balance being purchased from other companies." (Stipulation, paragraphs 4–5)

30. In failing to find, as requested:

> "Since Aug. 26, 1935, the respondent has owned or operated no property outside of Connecticut. It has owned or operated no line which crosses the Connecticut boundary. It has owned or operated no line connecting at the Connecticut state line with the line of any other utility. It has had no contract with any party outside of the state of Connecticut for the purchase or sale of electric energy. It has had no contract to deliver electric energy outside of Connecticut, or to receive electric energy outside or from outside of Connecticut. It has not bought or sold any electric energy outside of Connecticut. It has had no contract or arrangement calling for delivery of electric energy to any other com-

pany or utility at the state line or for the receipt of energy from any other company or utility at the state line." (Campbell, R. 36–45)*

31. In failing to find, as requested:

"The respondent has sold electric energy at wholesale to the Borough of Groton, a municipal corporation in Connecticut. This Borough has the charter right to purchase electric energy and distribute it within certain limits." (Tiffany, R. 324, 325, 328, 329–332, 354; Ex. 77)

32. In failing to find, as requested:

"The energy sold to the Borough of Groton was transmitted over a 33,000 volt line owned and operated by the respondent and connected with its generating plant at Montville, Connecticut. This energy was all metered at 33,000 volts at a place in Groton called Trails Corners. It was all delivered at 33,000 volts at points in Groton. One point of delivery was Trails Corners substation, where some of the energy went through a local distribution substation owned by the Borough after being transformed to 2300 volts. Thereafter this energy was distributed to numerous customers of the Borough located on its distribution system. The 33,000 volt line continued from Trails Corners, to a substation (called the Groton Long Point substation) which has, since Nov. 15, 1935, been owned by the Borough of Groton. There transformers owned by the Borough stepped the energy down to 6600 volts, and it was carried on lines owned by the Borough to a small substation, near the shore in Groton, owned by the Borough. From that substation some of the energy was distributed to local customers in Groton Long Point, after being transformed to 2300 volts. At this substation there were also connections with two 6600 volt cables which went under Fishers Island Sound for

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* References such as this are to testimony of the witness named and to pages in the official stenographer's report of the proceeding before the Trial Examiner.

[The above, including the above footnote, is all copied exactly from Exhibit A, attached to the petition for review. The page numbers on pages 14–33 hereof are those given by the reporter and consequently do not correspond with the pagination of the official record filed in this Court.]

a distance of about two miles to Fishers Island, which is part of New York. At this point of connection in Connecticut, the Borough until February, 1941, delivered some electric energy to a corporation which distributed electric energy on Fishers Island." (Tiffany, R. 354–358, 426–430, 438–439, 445; Thomas, R. 1361–1362; Stipulation, pp. 145–146)

33. In failing to find, as requested:

"The energy purchased by the Fishers Island Company from the Borough amounted to about one-third of the total amount of energy purchased by the Borough from the respondent, but to only about 1/5 of 1% of all of the energy supplied by the respondent in each year to all of its customers." (Tiffany, R. 464–465; Hughes, R. 2245–2251)

34. In failing to find, as requested:

"The South Meadow substation of the Connecticut Power Company is adjacent to the large steam generating plant of the Hartford Electric Light Company, known as the South Meadow plant. Nearby is the Dutch Point plant, a steam plant of the same company, used largely for reserve purposes. In addition, this company has several smaller plants in the vicinity of Hartford. All of its plants are connected electrically to the C.P. lines 1 and 2." (Mayott, R. 2535)

35. In failing to find, as requested:

"The Connecticut Power Company is a corporation entirely separate from the respondent. The Connecticut Power Company and the Hartford Electric Light Company were not affiliated in any way with the respondent. The respondent owned no stock in either of these companies, and neither of them owned any stock in the respondent. No person who was at any time an officer or director of the respondent served simultaneously in a similar capacity either the Connecticut Power Company or the Hartford Electric Light Company." (Kramarsik, R. 2545–2548)

36. In failing to find, as requested:

"For the Torrington-Winsted area, the respondent purchased energy from the Torrington Electric Light

Company. During most of the time, this was supplied under contract of which Ex. 11 is a copy. This contract recited that the Torrington Company obtained its supply either from its own plant or from the Connecticut Power Company, and that it might supply the respondent from either source. The charge was based upon the price paid by the Torrington Company to the Connecticut Power Company, regardless of the source from which the supply should come. By letters dated March 19, 1941 and March 21, 1941, which appear in the Record at pp. 171–172, this contract was modified, and about the middle of June, 1941, an oral agreement was made by which the Torrington Company agreed to supply all of the energy from its own steam plant in Torrington." (Campbell, R. 138–139)

37. In failing to find, as requested:

"For the East Hampton and Bristol areas, the respondent purchased energy directly from the Connecticut Power Company, with which it had formal contracts. Copies of those for the periods beginning January 1, 1937, are Exs. 8 and 25. These contracts contained no express provision as to the source of the energy, but there was a provision that the unit charge for energy supplied should be adjusted on the basis of the cost of coal in the bunkers of the South Meadow plant of the Hartford Company in Hartford. In addition, there was a stipulated demand charge."

38. In failing to find, as requested:

"The Connecticut Power Company at all times had an understanding with the Hartford Electric Light Company under which the Hartford was obligated to supply such capacity as might be required, in addition to the capacity of the Connecticut Power Company's own water power plants, to carry the loads on the C.P. 1 and 2 lines, including those at Bristol, at Middletown (which included the East Hampton area of the respondent), and at Torrington (which included the Torrington-Winsted area of the respondent). This understanding was eventually embodied in formal contracts, the one relating to Middletown and Torrington being dated June 1, 1936, and the one relating to Bristol being

dated June 8, 1937. These contracts provided both for a demand charge and for an energy charge. Exs. 36 and 37 contain copies of these contracts." (Ferguson, R. 2426–2469, 2512, 2519–2522; Barney, R. 645–646, 649–650; Colvin, R. 1773, 1775–1792, 1810–1814)

39. In failing to find, as requested:

"The maximum amount purchased at any time by the respondent for its three areas connected with C.P. lines 1 and 2 from the Torrington Company and the Connecticut Power Company was less than 19,836.8 k.w." (Hopper, R. 2492)

40. In failing to find, as requested:

"The capacities of the plants of the Hartford Company and the Connecticut Power Company in Connecticut which were connected with the C.P. 1 and 2 lines have been as follows:

(1) Hartford Electric Light Company:

South Meadow	Steam	130,000 k.w.
Dutch Point	Steam	34,000 k.w.
Tariffville	Hydro	1,500 k.w.

(2) Connecticut Power Company:

Falls Village	Hydro	9,000 k.w.
Unionville	Hydro	1,600 k.w."

(Mayott, R. 2534–2537)

41. In failing to find, as requested:

"Except during a brief period when the service was interrupted owing to the flood of 1936, the South Meadow plant of the Hartford Company was continually generating a substantial amount of energy, and each generator thereon which was generating was at all times connected with the 66,000 volt bus of the South Meadow substation." (Hopper, R. 2480–2483; Mayott, R. 2536, 2537, 2540, 2541)

42. In failing to find, as requested:

"The generating capacity of the South Meadow plant was at all times greater than the contemporaneous maximum demand on the Hartford's own system plus that on C.P. lines 1 and 2." (Mayott, R. 2538, 2539)

43. In failing to find, as requested:

"At no time since January 1, 1937, were the combined loads of the respondent on C.P. lines 1 and 2 more than the amount generated contemporaneously by generators located in Connecticut connected with the C.P. lines 1 and 2." (Hopper, R. 2480–2482, 2483)

44. In failing to find, as requested:

"The Connecticut Power Company has been since January 1, 1937, a member of the Connecticut Valley Power Exchange. The Connecticut Valley Power Exchange is a voluntary association of several power companies, operating under an agreement. Since January 1, 1937, the members have been the Connecticut Power Company, the New England Power Company, and the Turners Falls Power & Electric Company. The respondent has not been a member of the Exchange during any period which is important in this case. None of the parties to this agreement was under any obligation to furnish any energy to any of the others, and the arrangement can be terminated at will. The object of the Exchange is 'to exchange surplus power so that the lowest available increment cost sources will be used in supplying the combined load'. The Exchange is not a medium for jointly arranging load-carrying capacities. It is expressly understood that each member concerned must keep on hand a sufficient reliable capacity, including a sufficient reserve, to provide for its own load. No contract of sale or purchase and no primary power supply is involved in the operation of the pool. No fixed amount was paid for energy furnished by the Exchange, but any party generating electric energy at the request of the Exchange was credited with the incremental cost (if any) which it incurred in generating such energy, and the party which otherwise would have had to generate it was charged with its decremental cost—*i.e.*, what it would have cost it to have generated the additional amount which it was relieved from generating by reason of another source of supply being made available to the combined loads on the circuits. The savings of the Exchange thus computed were divided equally between the three members regardless of the amount of electric energy contributed by each. No attempt was

made in the conduct of the Exchange to allocate supply to any particular load and no effort was made to keep track of the source of supply for any load. The schedule of operations submitted by the manager of the Exchange to the members for operations during the ensuing twenty-four hours was not obligatory upon any member, and in fact in many instances the schedule was not adhered to." (Mayott, R. 701–702, 708, 718, 730, 764–765, 768, 835, 843–945, 2544; Barney, R. 650–652, 1885–1889; Ex. 39)

45. In failing to find, as requested:

"The distance on the Hartford-Agawam line from the Massachusetts boundary to the South Meadow substation is about 27 miles." (Colvin, R. 1794)

46. In failing to find, as requested:

"The tap on the C.P. lines which supplied Middletown, and through it the *East Hampton* area of the respondent is about 11 miles from Hartford and consequently about 38 miles from the Massachusetts boundary as the lines run. In Middletown (which was served at retail by Connecticut Power Company), energy was transformed by Connecticut Power Company to 13.8 k.v., at which some of it was supplied to customers of that company. Under that voltage it crossed the Connecticut River easterly by submarine cable to Portland (which was also supplied at retail by Connecticut Power Company). From the substation at Portland, many circuits emanated to serve customers at 13.8 k.v., and one of these led to Pole 110 in Portland, supplying a group of customers of the Connecticut Power Company on the way. Up to this point the facilities were owned by the Connecticut Power Company. Leaving Pole 110 was a circuit, owned by the respondent, which served East Hampton and the surrounding territory. The line from Pole 110 through this territory extended for a distance of about 15 miles and went to 5 different substations of the respondent in which there were transformers which stepped down the energy to lower voltages. Until the hurricane of September, 1938, the respondent owned a hydro-electric generating plant at Leesville in this area. This was connected with the lines mentioned. All of

the energy at this plant was used by the respondent in its East Hampton area. The facilities which the respondent owned were those to the east of Pole 110 in Portland, and its lines from that point extended only into the East Hampton territory above described." (Exs. 26 and 38; Miller, R. 1137, 1138; Thomas, R. 1291, 1356; Colvin, R. 1794–1805)

47. In failing to find, as requested:

"The tap on the C.P. lines by which *Bristol* is supplied is about 24 miles from Hartford and consequently about 51 miles from the Massachusetts boundary as the lines run. The tap extends for a distance of about 2 miles from the C.P. lines to the Bristol substation. This tap line is owned by the Connecticut Power Company. The Bristol substation and its facilities are owned by the respondent. The outdoor substation includes step-down transformers transforming the energy from 66 k.v. to 13.8 and 4.6 k.v. There are also in the substation oil circuit breakers, disconnect switches for the control thereof, lightning arresters, current transformers, and so forth, as well as steel structures carrying the conductors. In the adjoining building is a synchronous condenser and auxiliaries therefor. This substation is located in the heart of Bristol. Some customers are supplied directly by 13.8 k.v. circuits, and several others by the 4.6 k.v. circuits, in various parts of the city." (Exs. 28, 38 and 82) (Thomas, R. 1292, 1322, 1333, 1617; Colvin, R. 1712–1715)

48. In failing to find, as requested:

"The point at which the C.P. line is tapped to supply Torrington is about 39 miles from Hartford, and consequently 66 miles from the Massachusetts boundary as the lines run. Except for the supply of energy obtained from its own hydro plant at Robertsville, (a short distance north of Winsted), the respondent obtained all of the energy for its *Torrington-Winsted* area from Torrington Electric Light Company, which in turn, until June 17, 1941, obtained it from Connecticut Power Company. At Torrington, the Connecticut Power Company owns transformers which step the energy down to 2.4 k.v., at which voltage it is supplied to Torrington Elec-

tric Light Company. Torrington Electric Light Company serves the city of Torrington. It delivered energy at 2.4 k.v. to the respondent. The energy then went through the transformers of the respondent at Torrington, in which it was stepped up to 27.6 k.v. and flowed at this voltage to stepdown transformers in Winsted, about ten miles distant, over lines owned in part by the respondent. Between the point of delivery at Torrington and Winsted, the line formerly served numerous customers but at the time of the hearing only one customer was served from the line between these points. At Winsted are located transformers on one side of which the voltage is 27.6 k.v. and on the other side 4.8 k.v. The 4.8 k.v. lines lead to various parts of Winsted and to Robertsville. The generating plant at Robertsville generates energy at 4.8 k.v., at which voltage the line goes to the substation at Winsted, serving numerous customers on the way, and customers are also served at 4.8 k.v. from lines running north from Robertsville." (Exs. 27, 38 and 79; Miller, R. 1138; Thomas, R. 1298, 1318; Colvin, R. 1776–1778)

49. In failing to find that the respondent's facilities at Torrington and Winsted have not been connected with the C.P. lines for many months, and that the connection with them has been severed so that it is impossible for the respondent's Torrington-Winsted area to be supplied with any energy from the C.P. lines without very extensive reconstruction.

50. In failing to find, as requested:

> "The only facilities owned or operated by the respondent in its East Hampton area were 'facilities used for the generation of electric energy' or 'facilities used in local distribution'." (See brief of respondent*, pp. 56–71)

51. In failing to find, as requested:

> "The only facilities owned or operated by the re-

* The brief referred to is that dated September 17, 1941, filed with the Federal Power Commission in the above entitled matter on or about that date.

spondent in its Bristol area are 'facilities used in local distribution'." (See brief of respondent, pp. 56–71)

52. In failing to find, as requested:

"The only facilities in the Bristol area which counsel for the Commission contend were not 'facilities used in local distribution' are located in one substation owned by the respondent in the heart of Bristol. The facilities there were all designed in connection with service of the respondent's distribution system in Bristol and are used for the purpose of distributing the power received from the Connecticut Power Company locally to the customers of the respondent." (See brief of respondent, pp. 58, 63, 66–67)

53. In failing to find, as requested:

"The synchronous condenser in Bristol is used only during periods when the larger industrial customers there are drawing considerable power. The major object in operating it is to maintain the voltage on the bus in Bristol with which the feeders to some of the local customers are connected. The synchronous condenser produces the magnetizing current which is necessary to the proper operation of the distribution system." (See brief of the respondent, pp. 63, 67)

54. In failing to find, as requested:

"The transformers in the substation at Bristol were designed to supply energy at two particular voltages which are suited to the requirements of the Bristol distribution system." (See brief of respondent, pp. 63, 66–67)

55. In failing to find, as requested:

"All the facilities of the Torrington-Winsted area owned or operated by the respondent are 'facilities used for the generation of electric energy' or 'facilities used in local distribution'." (See brief of respondent, pp. 56–71)

56. In failing to find, as requested:

"The regulations for accounting of the Federal

Power Commission and also the regulations adopted in the uniform system of accounting for electric utilities of the National Association of Railroad and Utilities Commissioners and by the Public Utilities Commission of the State of Connecticut all provide (Ex. 90, par. 16; Ex. 91, par. 14 and 15):

'Stations which change the energy from transmission to distribution voltage shall be classified as distribution stations'."

57. In failing to find, as requested:

"Electric energy loses its identity when placed on a conductor and that generated at one source cannot be distinguished from that generated at another." (Thomas, R. 1600–1601)

58. In failing to find, as requested:

"Electric energy is drastically changed by a transformer. The operation of a transformer is 'transferring energy from one form to another' (R. 1316), and the transformers 'make a substantial change both in the voltage and the current'. (R. 1624) The current on one side of the transformer is an entirely different current from that on the other side. There is no electrical connection between the two sides of the transformer. (Lewis, R. p. 2319; Ex. 83) In the transformer the energy is converted largely to electro-magnetic form. In it the energy undergoes essentially a double transformation. Broadly speaking, the energy inside of a transformer 'has been converted and reshaped so as to give it new characteristics'." (Lewis, R. 2333–2337)

59. In failing to find, as requested:

"In its Order 42, by which the Uniform System of Accounts was put into effect, the Federal Power Commission provided that Account No. 352, 'Station Equipment,' should include the cost, among other things, of 'transformer banks, etc. which are used for the purpose of changing the characteristics of electricity in connection with its distribution'."

60. In failing to find, as requested:

"It has not been shown that any electric energy generated outside of Connecticut reached any of the facilities of the respondent." (See brief of respondent, pp. 43–56)

61. In failing to find, as requested:

"There is no substantial evidence that any electric energy generated outside of Connecticut reached any of the facilities of the respondent." (See brief of respondent, pp. 43–56)

62. In failing to find, as requested:

"The State of Connecticut has a commission created by statute known as the Public Utilities Commission. That Commission has jurisdiction over the contracts, (wholesale and retail) rates, and facilities, relating to the electric energy business of the respondent, and has asserted such jurisdiction. (Hyde, R. 222–223, 235) Regulation by the Connecticut Public Utilities Commission of the accounting methods of the respondent is authorized and governed by Sections 3604, 3603 and 3606 of the General Statutes of Connecticut, Revision of 1930, and Section 1198-E of the 1939 Supplement to the General Statutes."

63. In failing to find, as requested:

"A Connecticut uniform system of accounts effective January 1, 1941, was prescribed by Docket No. 6861, and a system of accounts in effect prior to January 1, 1941, had been adopted by Docket No. 4187, which docket numbers are those of the Public Utilities Commission of the State of Connecticut."

(The respondent offered to prove this by Exhibit 14 for identification and also offered to show through Mr. Hyde, a former member of the Public Utilities Commission of the State of Connecticut, that there is now and was both prior and subsequent to August 26, 1935, a system of accounts prescribed by the Public Utilities Commission of the State of Connecticut and that the respondent had complied with that system. This offer of proof, however, the examiner erroneously excluded.) (Ex. 14 for identification; R. 228, 234, 235, 240–245, 249–251)

64. In failing to hold that the Respondent is not a public utility within the meaning of Part II and Part III of the Federal Power Act.

65. In failing to hold that the Respondent was not at any time after August 26, 1935, a public utility within the meaning of Part II and Part III of said Act.

66. In failing to hold that facilities for "transmission of electric energy in interstate commerce" and for "sale of electric energy at wholesale in interstate commerce", as those terms are used in Part II of the Federal Power Act, include only facilities which are used in business which is essentially interstate, as opposed to local, in character.

67. In failing to hold and to find that the Respondent owns or operates no such facilities as those described in paragraph 66 hereof.

68. In failing to hold and to find that since August 26, 1935, the Respondent has owned or operated no such facilities as those described in the paragraph hereof marked 66.

69. In failing to hold and to find that no facilities of the Respondent are being used in any business except that of an essentially local character.

70. In failing to hold and to find that no facilities of the Respondent have at any time since August 26, 1935, been used in any business except of an essentially local character.

71. In failing to hold that even if energy generated in one state was transmitted to consumers in another state over facilities of the Respondent, that part of the transmission which took place on the Respondent's facilities was not interstate commerce.

72. In failing to hold that the only facilities owned or operated by the Respondent in its East Hampton area were "facilities used for generation of electric energy" or "facilities used in local distribution".

73. In failing to hold that the only facilities owned or operated by the Respondent in its Bristol area were "facili-

ties used for generation of electric energy" or "facilities used in local distribution".

74. In failing to hold that the only facilities owned or operated by the Respondent in its Torrington-Winsted area were "facilities used for generation of electric energy" or "facilities used in local distribution".

75. In failing to hold that the jurisdiction of the Federal Power Commission over the Respondent is precluded by Section 1414(c) of the Supplement to the Connecticut General Statutes of 1935, which gives to the Public Utilities Commission of Connecticut specific jurisdiction over security issues, mergers, consolidations, dissolutions, managerial contracts, the conditions of the utility plant, the equipment and manner of operation of all public service companies, the sale, lease, assignment or mortgage of any essential part of utilities, franchises, plant or equipment or other property, and provides:

> "No . . . Board or Commission purporting to act under any governmental authority other than that of this state or of its divisions . . . shall interfere with or attempt to interfere with or exercise authority or control over any gas, electric or water company incorporated by this state, and engaged in the business of supplying service within this state . . . without having first obtained the approval of the Commission, except as the United States may properly regulate actual transactions in interstate commerce."

76. In failing to hold that the fact that the Borough of Groton is a municipal corporation prevents sales by the Respondent to it from subjecting the Respondent to the jurisdiction of the Commission.

77. In failing to hold that the jurisdiction of the Commission does not extend over those matters of any company which are subject to regulation by the state in which it is located.

78. In failing to hold and to find that all of the facilities

of the Respondent and all of its business are subject to regulation by the Public Utility Commission of the State of Connecticut.

79. In failing to hold and to find that where electric energy is transmitted into a state and put through a transformer in order to render the energy suitable for local customers the effect of the transformer is to terminate the interstate journey of the energy.

80. In failing to hold and to find that the effect of the transformers at Groton and Groton Long Point was to prevent any transmission of electric energy over facilities of the Respondent to Groton or Groton Long Point from being transmission in interstate commerce and to prevent the sale thereof from being a sale of such energy at wholesale in interstate commerce.

81. In holding that the Respondent is or at any time was subject to the Uniform System of Accounts prescribed by the Commission or any orders of the Commission relating to accounts.

82. In so far as it made any finding or ruling contrary to any of the propositions set forth in the paragraphs hereof numbered 29 to 80 inclusive.

The Respondent hereby requests the Commission to make each of the findings and rulings set forth in the above paragraphs numbered 29–80, inclusive.

The petitioner also specifies in this petition various rulings made in the course of the proceedings by the Trial Examiner, which rulings appear to have been adopted by the Commission. In support of this application, it relies upon the following errors of this kind, and contends that the Commission erred in so far as it approved, adopted or failed to reverse the following rulings of the Trial Examiner, to all of which exceptions were duly taken (as appears by the general arrangement appearing at pp. 44–45,

227 and 490 of the official stenographer's report of the proceedings).

• • •

4. Sustaining objections to questions by counsel for the Respondent of the said witness Hyde in direct examination as to the meaning of the terms "facilities for transmission" and "facilities for local distribution" of an electric company and his opinion of such meaning (as appears in said report at pp. 259–263).

• • •

6. Sustaining objections to questions by counsel for the Respondent of said witness Hyde in regard to his opinion as to the meaning of said terms as used generally in the industry (as appears in said report at pp. 265–269).

7. Sustaining objections to questions by counsel for the Respondent of said witness Hyde as to the classification of stations which change energy from transmission to distribution (as appears in said report at p. 269).

8. Sustaining objections to questions by counsel for the Respondent of said witness Hyde as to the definition of "facilities for local distribution" of electric companies in the uniform system of accounting for electric utilities of the National Association of Railroad and Utilities Commissioners and in the uniform system of accounting of the Federal Power Commission (as appears in said report at pp. 269–272).

• • •

12. Admitting over the objection of counsel for the Respondent Exhibit 30 (as appears in said report at pp. 601–603).

13. Overruling objections of counsel for the Respondent to questions asked of the witness Austin D. Barney by counsel for the Commission in regard to letters contained in Exhibit 30 (as appears in said report at pp. 604–616).

• • •

21. Admitting over the objection of counsel for the Respondent Exhibit 48 (as appears in said report at pp. 981–982).

22. Admitting over the objection of counsel for the Respondent Exhibit 50 (as appears in said report at pp. 984–987).

• • •

29. Admitting over the objection of counsel for the Respondent Exhibits 32, 33 and 34 (as appears in said report at pp. 1097–1098).

• • •

32. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of the witness Harold E. Miller in regard to the sources of supply of electric energy with which the requirements of the Winsted, Bristol and East Hampton systems could have been supplied (as appears in said report at pp. 1115–1119).

33. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of said witness Miller in regard to supply of energy to C.P. 1 and C.P. 2 lines (as appears in said report at pp. 1128–1130).

• • •

35. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of said witness Miller in regard to facilities used to deliver electric energy to various parts of the system of the Connecticut Light and Power Company and explanations and references to flow diagrams and other material relative thereto, including all questions on pages 1139–1212, 1223–1230, 1243–1244, 1246–1254).

• • •

37. Overruling objections of counsel for the Respondent to question asked by counsel for the Commission in direct

examination of the witness Percy H. Thomas in regard to supply of electric energy from Massachusetts to the Winsted, Bristol and East Hampton districts of the Respondent (as appears in said report at p. 1270).

38. Refusing to strike out the answer of said witness Thomas in direct examination to the question on pp. 1278–1279 to the effect that no electric energy was being supplied from certain generating capacities in Connecticut during the periods which the witness Miller so indicated (as appears in said report at pp. 1278–1281).

39. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of the said witness Thomas regarding principles underlying the witness Miller's conclusions (as appears in said report at pp. 1285–1287).

40. Refusing to strike out the answer of the witness Thomas on pp. 1290–1293 of said report relating to system of facilities by which he testified that the electric energy requirements for the Winsted, Bristol and East Hampton districts of the Connecticut Light and Power Company were supplied in whole or in part from Massachusetts (as appears on pp. 1290–1293 of said report).

41. Refusing to strike out the answer of the witness Thomas on pp. 1294–1295 of said report characterizing certain facilities as transmission facilities in the Winsted district (as appears in said report at pp. 1293–1296).

42. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of the witness Thomas relating to functions served by facilities between Torrington and Winsted belonging to the Respondent (as appears in said report at pp. 1296–1299).

43. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of the witness Thomas as to the meanings and

definitions of "transmission" and "local distribution" on p. 1299 (as appears in said report at pp. 1299–1303).

44. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of the witness Thomas in regard to whether facilities of the Respondent in Torrington and Winsted and between those places are facilities for the transmission of electric energy, as distinguished from local distribution of electric energy on pp. 1306 and 1307 (as appears in said report at pp. 1305–1310).

45. Refusing to strike out the answer of the witness Thomas to question in direct examination by counsel for the Commission to the effect that certain transformers "constitute a link in the transmission of energy from Massachusetts to Winsted" and similar expressions (as appears in said report at pp. 1316–1320).

46. Refusing to strike out the answer of the witness Thomas to question in direct examination by counsel for the Commission as to whether certain facilities were facilities for the transmission of electric energy as distinguished from local distribution of electric energy (as appears in said report at pp. 1334–1336).

47. Overruling objections of counsel for the Respondent to question on pp. 1338–1339 asked by counsel for the Commission in direct examination of the witness Thomas in regard to certain facilities being facilities for transmission of electric energy transmitted from one state and consumed in another and in regard to electric energy being consumed by persons other than the transmitter thereof (as appears in said report at pp. 1338–1339).

48. Overruling objection to question and denying motion to strike out answer to same made by Respondent to question asked in direct examination of the witness Thomas by counsel for the Commission on p. 1354, beginning with the statement that certain step-down transformers and certain

other appurtenances are parts of the facilities for transmitting electric energy from Massachusetts to Bristol (as appears in said report at pp. 1353–1355).

49. Denying motion to strike out all testimony of the witness Thomas in which he characterized functions or use of facilities as distinguished between transmission and local distribution (as appears in said report at p. 1358).

50. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of said witness Thomas that certain facilities in the East Hampton district were facilities for the transmission of electric energy as distinguished from local distribution (as appears in said report at pp. 1357–1359).

51. Overruling objections of counsel for the Respondent to questions asked by counsel for the Commission in direct examination of the witness Thomas to the effect that certain facilities were facilities for transmission of electric energy transmitted in Massachusetts and consumed in Connecticut (as appears in said report at pp. 1359–1360a).

52. Overruling objections of counsel for the Respondent to question asked by counsel for the Commission in direct examination of the witness Thomas on p. 1366 in regard to whether certain facilities were facilities for the transmission of electric energy which was transmitted from the State of Connecticut and consumed in the State of New York by persons other than the transmitter thereof (as appears in said report at pp. 1366–1369).

* * *

54. Admitting over the objection of counsel for the Respondent Exhibits 64 and 65 (as appears in said report at pp. 1563–1564).

55. Admitting over the objection of counsel for the Respondent Exhibits 61 and 62 (as appears in said report at pp. 1564–1565).

56. Denial of motion of counsel for the Respondent to

strike out the answer of said witness Miller to question of counsel for the Commission in redirect examination appearing on pp. 1569–1570 relating to flow of Massachusetts energy to C.P. lines, and other matter (as appears in said report at pp. 1568–1575).

57. Denial of motion of counsel for the Respondent to strike out the answer of said witness Miller to question of counsel for the Commission in redirect examination appearing on pp. 1573–1574 in relation to 280 days, to which the witness had previously referred (as appears in said report at pp. 1573–1575).

• • •

59. Admitting over the objection of counsel for the Respondent Exhibit 68 (as appears in said report at pp. 1692–1694).

60. Admitting over the objection of counsel for the Respondent Exhibit 69 (as appears in said report at pp. 1694–1695).

61. Admitting over the objection of counsel for the Respondent Exhibit 70 (as appears in said report at p. 1695).

62. Overruling objections of counsel for the Respondent to the questions asked of the witness Richard B. Curran on direct examination by counsel for the Commission appearing on pp. 1846–1850 based upon a letter of July 11, 1939, sent by the witness to Federal Power Commission, including all questions appearing in said report at pp. 1846–1850.

• • •

67. Admitting over the objection of counsel for the Respondent Exhibit 71 (as appears in said report at pp. 2555–2556).

• • •

MEMORANDUM.

The extracts from the record which follow in this Appendix comprise all the material designated by counsel for the respondent in addition to the designations of petitioner, and are printed herein by agreement of counsel.

BEFORE THE

Federal Power Commission.

Docket No. IT-5665.

IN THE MATTER OF

THE CONNECTICUT LIGHT & POWER COMPANY.

EXTRACTS FROM THE RECORD FILED BY FEDERAL POWER COMMISSION.

[Note: All figures in brackets and in italics are the page numbers of the original Record in this case.]

[*1-B*]

FEDERAL POWER COMMISSION WASHINGTON, D. C.

ORDER NO. 42

(Adopted June 16, 1936)

PRESCRIBING A SYSTEM OF ACCOUNTS FOR PUBLIC UTILITIES AND LICENSEES UNDER THE FEDERAL POWER ACT

The Federal Power Commission acting pursuant to authority granted by the Federal Power Act, particularly Section 301(a), 304(a), and 309, and Paragraph (13) of Section 3, and Section 4(b) thereof, and finding such action necessary and appropriate for carrying out the provisions of said Act, hereby adopts the accompanying system of accounts entitled, "Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to

the Provisions of the Federal Power Act", and the rules and regulations contained therein; and

It is hereby ordered:

(1) That said system of accounts and said rules and regulations contained therein be and the same are hereby prescribed and promulgated as the system of accounts and rules and regulations of the Commission to be kept and observed by public utilities subject to the jurisdiction of the Commission and by licensees holding licenses issued by the Commission, to the extent and in the manner set forth therein;

(2) That said system of accounts and rules and regulations therein contained shall, as to all public utilities now subject to the jurisdiction of the Commission and as to all present licensees, become effective on January 1, 1937, and as to public utilities and licensees which may hereafter become subject to the jurisdiction of the Commission, they shall become effective as of the date when such public utility becomes subject to the jurisdiction of the Commission or on the effective date of the license;

(3) That a copy of said system of accounts and rules and regulations contained therein be forthwith served upon each public utility subject to the jurisdiction of the Commission, and each licensee or permittee holding a license or permit from the Commission.

This system of accounts supersedes the system of accounts prescribed for licensees under the Federal Water Power Act; and Order No. 13, entered November 20, 1922, prescribing said system of accounts, is rescinded effective January 1, 1937.

Adopted by the Commission on June 16, 1936:

LEON M. FUQUAY
LEON M. FUQUAY,
Acting Secretary.

* * * * * * [2]

[Copy]

FEDERAL POWER COMMISSION
Washington

Jun 30 1936

To All Public Utilities and Licensees:

The Federal Power Commission, acting pursuant to authority granted by the Federal Power Act, has prescribed and promulgated a Uniform System of Accounts, and rules and regulations governing the same, to be kept by all public utilities subject to the jurisdiction of the Commission and by licensees holding licenses issued by the Commission, to the extent and in the manner set forth therein.

A copy of said system of accounts is herewith enclosed. Additional copies are available upon request, and printed copies will be available in the near future.

The Commission is unable to determine from its records in some cases whether particular electric utilities are subject to its jurisdiction. Should any electric utility, upon whom this system of accounts is served, consider that it is not subject to the provisions of the Federal Power Act, the Commission should be advised thereof promptly with a full statement of reasons in support of such contention.

FEDERAL POWER COMMISSION
By Leon M. Fuquay
Leon M. Fuquay
Acting Secretary

Enclosure

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* * * * * * [3]

Following are the lists of Permittees Licensees, and Public Utilities on whom were served the "Uniform System of Accounts Prescribed for Public Utilities and Licensees" on June 30, 1936, together with copies of the letters of transmittal.

Registered Receipt Rec'd	Name	Address
* * *		
	CONNECTICUT	
7-3-36	The Connecticut Light & Power Co.	36 Pearl Street Hartford, Connecticut
* * *		

* * * * * * [4]

Return receipt showing receipt by the Connecticut Light and Power Company of Order No. 42 and the Uniform System of Accounts.

No. 443705 (Received July 3, 1936)

[*1-B-1*]

FEDERAL POWER COMMISSION

UNIFORM SYSTEM OF ACCOUNTS

PRESCRIBED FOR

PUBLIC UTILITIES AND LICENSEES

SUBJECT TO THE PROVISIONS OF

THE FEDERAL POWER ACT

[Seal of the
Federal Power Commission
U. S. A.]

Revised to December 31, 1936

EFFECTIVE JANUARY 1, 1937.

SUPERSEDES THE SYSTEM OF ACCOUNTS PRESCRIBED FOR LICENSEES UNDER THE FEDERAL WATER POWER ACT

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* * * * * * [*1-B-58*]

16. TRANSMISSION AND DISTRIBUTION PLANT.

For the purpose of this system of accounts:

A. "Transmission system" means: (1) All land, conversion structures, and equipment employed at a primary source of supply (*i.e.*, generating station, or point of receipt in the case of purchased power) to change the voltage or frequency of electric energy for the purpose of its more efficient or convenient transmission; (2) all land, structures, lines, switching and conversion stations, high tension apparatus, and their control and protective equipment between a generating or receiving point and the entrance to a distribution center or wholesale point; and (3) all lines and equipment whose primary purpose is to augment, integrate, or tie together the sources of power supply.

B. "Distribution system" means all land, sturctures, conversion equipment, lines, line transformers, and other facilities employed between the primary source of supply (*i.e.*, generating station, or point of receipt in the case of purchased power) and of delivery to customers, which are not includible in transmission system. as defined in Paragraph A, whether or not such land, structures and facilities are operated as part of a transmission system or as part of a distribution system.

NOTE.—Stations which change the energy from transmission to distribution voltage shall be classified as distribution stations.

* * * * * * [23]

5/11/37

FEDERAL POWER COMMISSION

ELECTRIC PLANT INSTRUCTION 2 D—UNIFORM SYSTEM OF ACCOUNTS

It appearing to the Commission:

(1) That Electric Plant Instruction 2D of the Uniform System of Accounts, prescribed for public utilities and licensees, provides as follows:

> "D. Not later than 2 years after the effective date of this system of accounts, each utility shall have completed the studies necessary for classifying its electric plant as of the effective date of this system of accounts in accordance with the accounts prescribed herein, and it shall submit to the Commission the entries it proposes to make to carry out the provisions of this instruction. It shall submit also a comparative balance sheet showing the accounts and amounts appearing in its books as of the effective date of this system of accounts and the accounts and respective amounts as of the same date after the proposed entries shall have been made."

(2) That it is necessary and desirable in order adequately to consider the adjusting entries specified in the above-named instruction that data relative to the history of each public utility, its acquisitions of electric operating units or systems, the original cost thereof, the amounts entered in the books in respect thereto, the method of determining original cost, and much related information be furnished.

It is ordered:

That in submitting the information called for in Electric Plant Instruction 2D of the Uniform System of Accounts, prescribed for public utilities and licensees, each utility shall furnish, insofar as applicable, the following statements properly sworn to by the officer in responsible charge of their compilation:

Statement A showing in outline the origin and development of the company including, particularly, a description (giving names of parties and dates) of each consolidation and merger to which the company, or a predecessor, was a party and each acquisition of an electric operating unit or system.

Statement B showing for each acquisition by the reporting company or any of its predecessors of an electric operating unit or system, the original cost, estimated, if not known, the cost to such company and the amount entered in the books in respect thereto as of the date of acquisition. If the depreciation, retirement or amortization reserve was adjusted as of the date of acquisition and in connection therewith, a full disclosure of the pertinent facts should be made. The difference between the original cost and the amount entered in respect thereto of each acquisition of an electric operating unit or system, as of the date of acquisition, should be clearly stated, and a summary of all transactions affecting such difference between the date of the respective acquisition and January 1, 1937, and the resultant amount on the latter date, should be set forth. The amount to be included in Account 100.5, Electric Plant Acquisition Adjustments, as of January 1, 1937, shall be subdivided so as to show the amounts applicable to (a) electric plant in service, (b) electric plant leased to others, and (c) electric plant held for future use. Whenever practical, such amount shall be classified according to nature, *i.e.*, going value, structural value, etc.

Where estimates are used in arriving at original cost or [24] the amount to be included in Account 100.5, a full disclosure of the method and underlying facts should be given. The method of determining the original cost of the electric plant acquired as operating units or systems should be described in sufficient detail to permit a clear understanding of the nature of the investigations which were made for that purpose.

Statement C showing any amounts arrived at by appraisals,

recorded prior to January 1, 1937, in the electric plant accounts (and not eliminated) in lieu of cost to the reporting company. This statement should give the full journal entry at the time the appraisal was originally recorded and if the entry had the effect of appreciating or writing-up the electric plantaccount, the amount of the appreciation or write-up should be traced, by proper description and explanation of changes, from the date recorded to January 1, 1937.

Statement D showing electric plant as of December 31, 1936, as classified in the books of account immediately prior to reclassification in accordance with the new system of accounts, including, under a descriptive heading, any unclassified amounts applicable jointly to the electric department and other departments of the unility.

Statement E showing summary of adjustments necessary to state, as of January 1, 1937, Accounts 100, Electric Plant, including all its subsidiary accounts, and Account 107, Electric Plant Adjustments, as prescribed in the Uniform System of Accounts.

Statement F showing electric plant (balance sheet Account 100) as of January 1, 1937, classified according to the accounts prescribed in the Uniform System of Accounts, effective on that date, and showing also the amount includible in Account 107, Electric Plant Adjustments.

Statement G giving a comparative balance sheet, as of January 1, 1937, showing the accounts and amounts appearing in the books before the adjusting entries have been made and after such entries shall have been made.

Statement H giving a suggested plan for depreciating, amortizing, or otherwise disposing in whole or in part of the amounts, as of January 1, 1937, includible in Account 100.5, Electric Plant Acquisition Adjustments, and Account 107, Electric Plant Adjustments.

Statement I giving the following statistical information relative to electric plant:

Production Plant

Steam Production

Separately for each steam plant: Name of plant, date of construction, name plate generating capacity (kw) as originally constructed and as at present, also name plate capacity and date of installation of each addition to generating capacity. The original cost, where available, by Accounts 310 and 316, of each steam production plant.

Hydraulic Production

Separately for each hydro plant: Name of plant, date of construction, capacity of reservoirs (acre feet), name plate generating capacity (kw) as originally constructed and as at present, also name plate capacity and date of installation of each addition to generating capacity. The original cost, where available, by Accounts 320 to 326, of each hydraulic production plant.

Internal Combustion Engine Production

For each internal combustion engine plant: Name of plant, date of construction, name plate generating capacity (kw) as originally constructed and as at present, also [25] name plate capacity and date of installation of each addition to generating capacity. The original cost, where available, by Accounts 330 to 336, of each internal combustion engine production plate.

Transmission Plant

Overhead Transmission Lines

For each overhead transmission line or for each group of transmission lines of the same voltage, same general type of construction and same number of circuits per structure: the voltage, length in miles, type of construction, kind and size of conductor. The original cost as of January 1, 1937, where available, by Accounts 340, 341, 342, 344, 345, 346, and 349, of each such line or group of lines.

Underground Transmission Lines

For each underground transmission line or for each group of transmission lines of the same voltage, same general type of construction and same number of circuits per structure: The voltage length in miles and type of construction. The original cost as of January 1, 1937, where available, by Accounts 340, 341, 342, 347, 348 and 349, of each such line or group of lines.

Transmission Substations

For each substation: Function, capacity (kva), high and low voltages of transformers, description and capacity of special items of equipment.

DISTRIBUTION PLANT

(a)

Overhead System

Number of pole and circuit miles, number of active meters or services connected (if available), description and number of each type of pole or tower

(a)

Underground System

Number of circuit miles, number of active meters or services connected (if available), description of type of construction and general statement of any special construction problem.

(a) If number of active meters or services is not available separately for overhead and underground systems, report totals.

Distribution Substation

General description of number, capacity (kva), and high and low voltages of transformers.

Line Transformers

Number and capacity.

Street Lighting and Signal Systems

Description and number of each type of street lighting standard, number and wattage of lamps, and description of signal system.

GENERAL PLANT

Description of principal structures and improvements. [26]

Number and type of transportation vehicles and appurtenant equipment.

Description of store, shop, and laboratory equipment.

Description of communication equipment.

Description of miscellaneous equipment.

* * * * * *

Adopted by the Commission on May 11, 1937.

/s/ LEON M. FUQUAY
LEON M. FUQUAY,
Acting Secretary

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* * * * * * [28-O]

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

Commissioners: CLYDE L. SEAVEY, Chairman; BASIL MANLY, LELAND OLDS, JOHN W. SCOTT. CLAUDE L. DRAPER, not participating.

July 11, 1939.

ORDER NO. 42-A

PRESCRIBING ACCOUNTING WITH RESPECT TO ELECTRIC PLANT ACQUISITION ADJUSTMENTS ACCOUNTS

The Commission, having under consideration the matter of uniform systems of accounts, particularly the text of the account entitled "Electric Plant Acquisition Adjustments" of the Commission's Uniform System of Accounts prescribed for Public Utilities and Licensees by orders of the Commission adopted June 16, 1936 and December 31, 1936; and

It appearing to the Commission that:

(a) Electric Plant Accounts Instruction 2-A of the said Uniform

System of Accounts provides that each utility* shall classify its electric plant in accordance with the Electric Plant Accounts as prescribed in said Uniform System of Accounts;

(b) Instruction 2-C of said Electric Plant Accounts provides that the detailed Electric Plant Accounts of each utility shall be stated on the basis of cost to the utility of electric plant constructed by it and on the basis of original cost, estimated if not known, of electric plant acquired by it as an operating unit or system; and further, that the difference between the original cost as above, and the cost to the utility of electric plant includible in Accounts 100.1 to 100.4, inclusive, for Class A and B Utilities (or Accounts 1100.1 and 1100.3 for Class C Utilities and Accounts 2100.1 and 2100.3 for Class D Utilities), after giving effect to any depreciation or amortization recorded by the accounting utility at the time of acquisition, shall be recorded in Electric Plant Acquisition Adjustments Account;

(c) Subdivision C of Electric Plant Acquisition Adjustments Account provides as follows:

> The amounts recorded in this account with respect to each property acquisition shall be depreciated, amortized, or otherwise disposed of, as the Commission may approve or direct.

[*28-P*] The Commission *finds* that:

(1) Studies of original cost, as provided for in paragraph (a) above, are being completed by utilities and amounts entered in the appropriate primary Electric Plant Accounts in accordance with Instruction 2-C above referred to, or will be so entered in said accounts in the near future;

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* The term "utility" as used herein means any public utility or licensee to which the Commission's Uniform System of Accounts is applicable.

(2) It is appropriate to consider the matter of disposition of such amounts as may be lodged in said Electric Plant Acquisition Adjustments Accounts; and

The Commission *orders* that:

(A) Debit amounts in an Electric Plant Acquisition Adjustments Account may be charged to Earned Surplus in whole or in part, or may be amortized over a reasonable period by charges to Miscellaneous Amortization without further order of the Commission;

(B) Should a utility desire to account for debit amounts in an Electric Plant Acquisition Adjustments Account in any manner different from that indicated in (A) above, it shall petition the Commission for authority to do so;

(C) Debit balances shall not be determined by application of credit amounts thereto;

(D) Credit amounts in an Electric Plant Acquisition Adjustments Account shall be accounted for as directed by the Commission;

(E) Where a utility subject to both Federal and State regulations, petitions the Commission in accordance with paragraph (B) above, the cooperative procedure heretofore adopted between Federal and State Commission shall be invoked;

(F) Disposition of amounts in Electric Plant Acquisition Adjustments Accounts, as above directed, is for accounting purposes only and such disposition shall not be construed as determining or controlling the consideration to be accorded these items in rate or other proceedings, nor shall anything contained herein prevent the Commission from subsequently ordering the amounts to be charged directly to surplus or from modifying the adopted amortization period.

By the Commission.

LEON M. FUQUA, *Secretary.*

* * * * * * [29]

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

Commissioners:

LELAND OLDS, Chairman, CLAUDE L. DRAPER, BASIL MANLY, JOHN W. SCOTT and CLYDE L. SEAVEY.

January 7, 1941

Docket No. IT-5665

In the Matter of

THE CONNECTICUT LIGHT & POWER COMPANY.

ORDER TO SHOW CAUSE.

The Commission, having under consideration the failure or refusal of The Connecticut Light & Power Company to comply with numerous orders and requirements of the Commission made under authority of the Federal Power Act;

It appearing to the Commission that:

(a) Pursuant to the authority granted by the Federal Power Act:

(1) By Order No. 42, adopted June 16, 1936, the Commission prescribed a Uniform System of Accounts for Public Utilities and Licensees, and by its Orders Nos. 42-A, 43, and 45 amended and supplemented the provisions of the said Uniform System of Accounts;

(2) By order adopted May 11, 1937, the Commission directed all public utilities and licensees subject to its jurisdiction to submit certain data, statements, and information, pursuant to Electric Plant Accounts Instruction 2-D of the Commission's Uniform System of Accounts, on or before January 1, 1939;

(3) By Order No. 36, adopted December 16, 1935, as amended and readopted February 4, 1936, Order No. 44, adopted December 31, 1936, and Order No. 50, adopted April 19, 1938, as amended by Order No. 60, adopted May 9, 1939, Order No. 62, adopted May 23, 1939, and Order No. 67, adopted November 3, 1939,

the Commission prescribed Rules of Practice and Regulations governing the filing of rate schedules subject to its jurisdiction;

(4) By orders adopted August 6, 1937, October 12, 1937, October 22, 1938, and October 17, 1939, and by Order No. 75, adopted September 24, 1940, the Commission pre- [30] scribed and amended a form of Annual Financial and Statistical Report, FPC Form No. 1, to be filed with the Commission by each Class A and B private, municipal, and public corporation engaged in the generation, transmission, or distribution of electricity, whether or not subject to the jurisdiction of the Commission;

(5) By orders adopted April 5, 1938, and December 6, 1938, Order No. 58, adopted February 23, 1939, and Orders Nos. 70 and 58-A, adopted November 14, 1939, the Commission approved and prescribed the preparing and filing of Power System Statements, FPC Form No. 64 (1937), FPC Form No. 64 (Revised 1938) FPC Form No. 64-A (1938), FPC Form No. 64 (1939) and FPC Form No. 64-A (1939), respectively, by each corporation, person, agency, authority, or other legal entity or instrumentality, whether public or private, which operates facilities for the generation, or transmission, or distribution of electric energy;

(b) All of the orders above described were duly served upon The Connecticut Light & Power Company;

(c) The time for compliance with all of the orders and requirements above described has expired;

(d) The Connecticut Light & Power Company may be a public utility under the provisions of the Federal Power Act;

(e) The Connecticut Light & Power Company is a corporation engaged in the business of and operating facilities for the generation, transmission, distribution and sale of electric energy;

(f) The Connecticut Light and Power Company has failed to comply with the Commission's Order No. 42 by failing or

refusing to keep its books in accordance with the system of accounts prescribed thereunder, effective January 1, 1937;

(g) The Connecticut Light & Power Company has failed to comply with Electric Plant Accounts Instruction 2-D of the Commission's Uniform System of Accounts and with the Commission's order adopted May 11, 1937;

(h) On January 1, 1939, The Connecticut Light & Power Company redeemed and refinanced its 3 3/4% First and Refunding Mortgage Bonds, Series E, and the unamortized debt discount and expense applicable thereto is being amortized over a period subsequent to the date of redemption of such bonds without the permission of the Commission required under Balance Sheet Accounts Instruction 6-E of the Commission's Uniform System of Accounts;

[*31*] (i) The Connecticut Light & Power Company has failed to comply with the Rules of Practice and Regulations prescribed by the Commission by failing or refusing to file rate schedules subject to its jurisdiction;

(j) The Connecticut Light & Power Company has failed to comply with the Commission's orders adopted August 6, 1937, October 12, 1937, October 22, 1938, and October 17, 1939, and Order No. 75, adopted September 24, 1940, by failing or refusing to make proper verification and oath to its Annual Reports, FPC Form No. 1, to this Commission for the years ending December 31, 1937, December 31, 1938, and December 31, 1939;

(k) The Connecticut Light & Power Company has failed to comply with the orders listed in paragraph (j) above by failing or refusing to make proper attestation and supplemental oath by its President, or other chief officer, to its Annual Report, FPC Form No. 1, to this Commission for the year ended December 31, 1939;

(l) The Connecticut Light & Power Company has failed to comply with the Commission's orders adopted April 5, 1938, and December 6, 1938, and Orders Nos. 58, 58-A

and 70, by failing or refusing to make proper certification to Power System Statements, FPC Form No. 64 (1937), FPC Form No. 64 (Revised 1938), FPC Form No. 64-A (1938), FPC Form No. 64 (1939) and FPC Form No. 64-A (1939);

(m) The Connecticut Light & Power Company has failed or refused to furnish information requested by the Commission with respect to a hurricane and flood investigation conducted in December, 1938;

(n) The Connecticut Light & Power Company, by the acts and failure or refusal to act referred to in paragraph (f) through (m) above, and otherwise, has pursued a general course of conduct with respect to compliance with Commission orders and requirements and with requests for information by this Commission pursuant to the Federal Power Act which may amount to wilful failure to comply with such orders, requirements, and requests;

The Commission *orders* that:

(A) The Connecticut Light & Power Company, under oath, show cause, if any there be, at a public hearing to be held commencing at 9:30 A.M., February 11, 1941, in the Hearing Room of the Federal Power Commission, Hurley-Wright Building, 1800 Pennsylvania Avenue, N. W., Washington, D. C.;

(1) Why it is not now, and has not been since August 26, 1935, a public utility within the meaning of the Federal Power Act;

[32] (2) Why it has failed or refused to comply with the Commission's Order No. 42, adopted June 16, 1936, and adopt the uniform System of Accounts prescribed thereby;

(3) Why it has failed to comply with Electric Plant Accounts Instruction 2-D of the Commission's Uniform System of Accounts, and with the Commission's order adopted May 11, 1937;

(4) Why it has failed to apply for and secure the permission of the Commission to amortize the unamortized debt discount and expense applicable to its redeemed and refinanced 3 3/4% First and Refunding Mortgage Bonds, Series E, in accordance with the provisions of Balance Sheet Accounts Instruction 6-E of the Commission's Uniform System of Accounts;

(5) Why it has failed or refused to file rate schedules subject to the jurisdiction of the Commission;

(6) Why it has failed or refused to make proper verification and oath as a public utility in its Annual Reports to this Commission for the years ending December 31, 1937, December 31, 1938, and December 31, 1939;

(7) Why it has failed or refused to make proper attestation and supplemental oath by its President, or other chief officer, in its Annual Report to this Commission for the year ended December 31, 1939;

(8) Why it has failed or refused to make proper certification to Power System Statements FPC Form No. 64 (1937), FPC Form No. 64 (Revised 1938), FPC Form No. 64-A (1938), FPC Form No. 64 (1939), and FPC Form No. 64-A (1939);

(9) Why it has failed or refused to furnish information requested by the Commission with respect to a hurricane and flood investigation conducted in December, 1938;

(10) Why the Commission should not institute appropriate proceedings against it, its officers, or directors for such failure or refusal to comply with applicable orders, requirements, and requests of the Commission;

(B) Nothing contained in this order shall be construed as a waiver or a stay of any of the requirements of any orders or other requests of the Commission which may be applicable to The Connecticut Light & Power Company.

By the Commission.

/s/ LEON M. FUQUAY
LEON M. FUQUAY
Secretary.

(SEAL)

* * * * * * [53]

DESIGNATION OF TRIAL EXAMINER.

By virtue of the order of the Commission adopted November 3, 1939, authorizing Commissioners and others to preside at hearings, and the Commission, by orders adopted *January 7, 28 and March 7, 1941,* having directed that a hearing be held in the above matter, to convene at 9:30 o'clock A.M. on *March 31, 1941, Glen R. Law* is designated as trial examiner to preside at said hearing.

Done, this 11 day of March, 1941, by authority of the Commission.

/s/ LELAND OLDS *Chairman.*

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* * * * * * [69]

June 5th, 1941

ANSWER TO ORDER TO SHOW CAUSE.

The Connecticut Light and Power Company, herein referred to as "the Company", in response to the Order to Show Cause of the Federal Power Commission, entered January 7, 1941 in the above entitled matter, hereby appears specially and for the sole purpose of asserting the lack of jurisdiction in the Commission over the Company or over the subject matter of its above-cited order of January 7, 1941, insofar as the Company is concerned, and without admitting by any allegation herein the jurisdiction of the Commission over the Company respectfully shows:

In answer to Paragraph A(1) of said Order to Show Cause inquiring why it is not now, and has not been since August 6, 1935, a public utility within the meaning of the Federal Power Act, the Company alleges that:

1. The Company is not now and has not been at any time since August 26, 1935, a public utility within the meaning of the Federal Power Act.

[70] 2. The Company does not transmit electric energy in interstate commerce, or sell electric energy at wholesale in interstate

commerce, and it does not own or operate facilities for such transmission or sale.

3. At no time since August 26, 1935, has the Company transmitted electric energy in interstate commerce, nor sold electric energy at wholesale in interstate commerce, or has it owned or operated any facilities for such transmission or sale.

4. All production, transmission, distribution and sale of electric energy in which the Company is engaged, or in which it has been engaged at any time since August 26, 1935, is and has been subject to regulation by the Public Utilities Commission of the State of Connecticut under the laws of said state.

5. All of the facilities of the Company pertaining to electric energy are used in the generation of electric energy, or are used in local distribution, or only for the transmission of electric energy in intrastate commerce.

6. At all times since August 26, 1935, all of the facilities of the Company pertaining to electric energy have been used for the generation of electric energy, or in local distribution, or only for the transmission of electric energy in intrastate commerce.

In answer to Paragraphs A(2) and (3) of said Order to Show Cause inquiring why it has failed or refused to comply with the Commission's Order No. 42, adopted June 16, 1936, and [*71*] adopt the Uniform System of Accounts prescribed thereby, and why it has failed to comply with Electric Plant Accounts Instruction 2-D of the Commission's Uniform System of Accounts, and with the Commission's order adopted May 11, 1937, the Company alleges that:

7. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

8. The method of accounting of the Company is, and at all times since August 26, 1935, has been, subject to the jurisdiction of the Public Utilities Commission of the State of Connecticut, and said Commission has at all times since August 26, 1935, prescribed such a method.

In answer to Paragraph A(4) of said Order to Show Cause in-

quiring why it has failed to apply for and secure the permission of the Commission to amortize the unamortized debt discount and expense applicable to its redeemed and refinanced 3 3/4% First and Refunding Mortgage Bonds, Series E, in accordance with the provisions of Balance Sheet Accounts Instruction 6-E of the Commission's Uniform System of Accounts, the Company alleges that:

9. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

10. The Company redeemed and refinanced its 3 3/4% First and Refunding Mortgage Bonds, Series E, with the Series H Bonds. The Company carried over the unamortized debt discount and expense applicable to the Series E Bonds, which is being amortized over the life of the Series H Bonds. It did not obtain permis- [72] sion to do so from the Federal Power Commission, but did obtain such permission and approval from the Connecticut Public Utilities Commission and the Securities and Exchange Commission under the Public Utility Holding Company Act of 1935. At that time the Company was a subsidiary of a registered holding company within the meaning of the Public Utility Holding Company Act. Copies of the applications to and the orders of the Connecticut Public Utilities Commission and the Securities and Exchange Commission have been furnished the Federal Power Commission. In connection with the State application and approval, the Connecticut Commission imposed certain terms and conditions with respect to maintenance and depreciation. The Securities and Exchange Commission, before granting its approval, imposed a condition, pursuant to provisions of Section 12 (c) and Section 20 (a) of the Public Utility Holding Company Act of 1935 to the effect that the Company could not declare or pay dividends on its Common Stock unless the Company lived up to the obligation imposed by the Connecticut Commission as to maintenance and depreciation. The application to the Connecticut Public Utilities Commission, as well as the order of the Connecticut Public Utilities Commission in this matter, were a part of the application to the Securities and Exchange Commission. Both

commissions had full knowledge of the proposed accounting treatment, but saw fit to impose only the conditions above referred to.

In answer to Paragraph A(5) of said Order to Show Cause inquiring why it has failed or refused to file rate schedules subject to the jurisdiction of the Commission, the [73] Company alleges that:

11. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

12. Pursuant to the statutes of Connecticut and the rules and regulations of the Connecticut Public Utilities Commission, the Company has filed with that Commission all of its proposed rate changes or new rates ten days before their respective effective dates. After the effective dates, it has filed with the Federal Power Commission whenever requested by it all of its rate schedules and also all changes in rate schedules.

The Company has never filed any rate schedule or made any report to the Federal Power Commission on the forms prescribed by Orders Nos. 36, 44 and 50, but it did file with the Federal Power Commission reports and rate schedules listed below.

In May, 1937, two complete sets of rate schedules and rules and regulations for all classes of its service in effect January 1, 1937, on Form 1199 of Federal Power Commission, Bureau of Engineering.

In June, 1938, rate schedules for all classes of service in effect on January 1, 1938, on Form 34 of Federal Power Commission, Bureau of Accounts, Finance and Rates, Division of Rates.

In January and February, 1939, rate schedules for electric service in certain communities, on Federal Power Commission Form 33R.

In January, 1940, rate schedules for electric service in certain communities, on Federal Power Commission Form 33 (Revised 1940).

[74] In January, 1941, rate schedules for electric service in certain communities, on Federal Power Commission Form 33 (Revised 1941).

In January, 1935, all of the then existing contracts of the Company with other utilities, on Federal Power Commission Form No. 2. Since that date it has filed each additional contract between the Company and any other utility.

On August 3, 1937, five statements on Form No. 11-127 which form was prescribed by order of the Federal Power Commission adopted March 23, 1937. These statements covered the production, transmission and utilization of electric energy in its main system (including Central) and its Greenwich, Winsted, Branford and Bristol districts, and covered the years 1934, 1935 and 1936.

In answer to Paragraph A(6) of said Order to Show Cause inquiring why it has failed or refused to make proper verification and oath as a public utility in its Annual Reports to this Commission for the years ending December 31, 1937, December 31, 1938, and December 31, 1939, the Company alleges that:

13. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

14. The accounts of the Company during the years referred to were not kept in accordance with the accounting orders of the Federal Power Commission applicable to public utilities subject to the provisions of the Federal Power Act. The Company consequently deleted from the form of verification on said Annual Report the words "in accordance with the accounting [75] and other orders of the Federal Power Commission, effective during said period", as a verification without deleting those words could not properly have been made. The words which were deleted, according to the instructions in said form, "may be deleted by respondents which are not public utilities within the purview of the Federal Power Act."

In answer to Paragraph A(7) of said Order to Show Cause inquiring why it has failed or refused to make proper attestation and supplemental oath by its President, or other chief officer, in its Annual Report to this Commission for the year ended December 31, 1939, the Company alleges that:

15. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

16. In the Company's report for said year, the supplemental oath was not executed by the President or other chief officer of the Company. The supplemental oaths in the 1937 and 1938 reports were executed by P. R. Fleming, Secretary and Treasurer.

17. The Company has at all times believed that the Federal Power Commission was without authority to require a company which was not a "public utility" within the meaning of Part II and Part III of the Federal Power Act to make such a report under oath, but considers it undesirable to make further contest in regard to this matter, and without admitting any failure on its part to comply with any valid law or regulation, its President hereby offers to sign and supple- [76] mental oath on said report, subject to any suitable qualifications.

In answer to Paragraph A(8) of said Order to Show Cause inquiring why it has failed or refused to make proper certification to Power System Statements FPC Form No. 64 (1937), FPC Form No. 64 (Revised 1938), FPC Form No. 64-A (1938), FPC Form No. 64 (1939), and FPC Form No. 64-A (1939), the Company alleges that:

18. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

19. These reports were signed as having been prepared by W. E. Jones, Statistician, and none of these reports was signed by an executive officer, or attested to by him.

20. The Company has at all times believed that the Federal Power Commission was without authority to require a company which was not a "public utility", within the meaning of Part II and Part III of the Federal Power Act, to have certifications to such Power System Statements made as provided on said forms, but considers it undesirable to make further contest in regard to this matter, and without admitting any failure on its part to comply with any valid law or regulation, it hereby offers to make cer-

tifications to said Power System Statements, subject to any suitable qualifications.

In answer to Paragraph A(9) of said Order to Show Cause inquiring why it has failed or refused to furnish information requested by the Commission with respect to a [77] hurricane and flood investigation conducted in December, 1938, the Company alleges that:

21. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

22. The information requested by the Federal Power Commission was extremely voluminous and it would have been difficult if not impossible for the Company to have supplied it at the time requested. The Company accordingly referred the Commission to the information with regard to this matter which it had furnished to the Public Utilities Commission of the State of Connecticut. The Company has at all times believed that the Federal Power Commission was without authority to require detailed information in such form from a company which was not a "public utility" within the meaning of Part II and Part III of the Federal Power Act, but considers it undesirable to make further contest in regard to this matter, and without admitting any failure on its part to comply with any valid law or regulation, it hereby offers to give to the Federal Power Commission such further information in regard to the hurricane and flood damage as the Commission may reasonably request.

In answer to Paragraph A(10) of said Order to Show Cause inquiring why the Commission should not institute appropriate proceedings against it, its officers, or directors for such failure or refusal to comply with applicable orders, requirements, and requests of the Commission, the Company alleges that:

[78] 24. Paragraphs 1–6 hereof are made a part hereof as if fully set forth.

25. The Company alleges that none of the orders or requests, set forth in the Order to Show Cause, with which it has failed to comply could properly be made applicable to it by the Federal

Power Commission, and that each such order and request was unauthorized by the Federal Power Act, and that no rule or regulation of the Commission providing for any such order or request was necessary or appropriate for purposes of the administration of said Act.

26. The Company denies that its failure to comply with any orders, requirements or requests of the Commission has been wilful. The Company is willing and anxious to comply with all reasonable requests of the Commission for information as to its business in the past and in the future. The Company hereby offers to stipulate all facts having any bearing on the matters set forth in said Order to Show Cause, and to have the issues determined upon such stipulation of facts rather than a hearing if the Commission is willing to stipulate to all facts which in the opinion of the Company have a bearing on said issues.

THE CONNECTICUT LIGHT AND POWER COMPANY
By C. L. CAMPBELL
C. L. Campbell, President
36 Pearl Street, Hartford, Connecticut.

[79] STATE OF CONNECTICUT
COUNTY OF HARTFORD ss.

C. L. Campbell, being first duly sworn, deposes and says: That he is President of The Connecticut Light and Power Company, respondent herein; that he has read the foregoing Answer and knows the contents thereof and that the same are true to the best of his knowledge and belief.

C. L. CAMPBELL

Subscribed and sworn to before me this 5th day of June, 1941.

MARJORIE J. ZEHNER,
Notary Public.

* * * * * * [92]

June 17, 1941

ORDER AMENDING ORDER TO SHOW CAUSE.

Upon consideration of the Answer to Order to Show Cause filed June 6, 1941, in the above-entitled matter by The Connecticut Light and Power Company;

The Commission *orders* that:

At the public hearing in the above-entitled matter to be held commencing on July 7, 1941, The Connecticut Light and Power Company may make showing in support of the allegations of its aforesaid Answer, as well as in response to the Commission's Order to Show Cause, adopted January 7, 1941, in the said matter.

By the Commission.

LEON M. FUQUAY, *Secretary.*

* * * * * * [269]

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

Commissioners

LELAND OLDS, Chairman, CLAUDE L. DRAPER, BASIL MANLY, JOHN W. SCOTT and CLYDE L. SEAVEY.

June 24, 1941

Docket No. IT-5665

In the Matter of

The Connecticut Light and Power Company

ORDER CHANGING PLACE OF HEARING

It appearing to the Commission that:

(a) Hearing in the above-entitled proceeding has heretofore been set to commence July 7, 1941, at 9:45 A.M., in the Hearing Room of the Commission, Hurley-Wright Building, 1800 Pennsylvania Avenue, N.W., Washington, D. C.;

(b) The convenience of the interested parties will be better served if the place of the hearing is changed to Hartford, Connecticut;

The Commission *orders* that:

The place of the hearing be changed to the Court Room, in the Federal Building, Hartford, Connecticut, and the said hearing be held commencing July 7, 1941, at 9:45 A.M., Eastern Daylight Saving Time.

By the Commission.

LEON M. FUQUAY, *Secretary.*

* * * * * * [3692]

UNITED STATES OF AMERICA.

FEDERAL POWER COMMISSION.

OPINION No. 75.

Docket No. IT-5665.

In the Matter of

THE CONNECTICUT LIGHT AND POWER COMPANY.

Appearances

For The Connecticut Light and Power Company: Lawrence A. Howard, Esq., Olcott D. Smith, Esq., Claude R. Branch, Esq., and T. J. Davis, Jr., Esq. For the Commission: Howard E. Wahrenbrock, Esq., and Howell Purdue, Esq.

BY THE COMMISSION:

FINDINGS ,

Upon consideration of the Order to Show Cause, issued by this Commission January 7, 1941, in the above entitled proceeding, requiring The Connecticut Light and Power Company (hereinafter sometimes referred to as the "Respondent"), to show cause, if any, why it was not and had not been since August 26, 1935, a public utility within the meaning of the Federal Power Act; why it had failed to comply with Order No. 42, adopted June 16, 1936, and with various other orders and requirements applicable to such public utilities and the nature of such failures; and upon consideration [3693] of the answer filed, the transcript of the hearing held, the exhibits and stipulations received, the memoranda of law and briefs filed, and the transcript of oral argument, the Commission *finds* that:

(1) The Connecticut Light and Power Company is a corporation organized and existing under the laws of the State of Connecticut, having its principal office in the city of Hartford, Connecticut, and engaged in the production, purchase, transmission, distribution, and sale of electric energy.

(2) From and including August 26, 1935, to the date of the hearing, the Respondent continuously sold electric energy in substantial amount to the Borough of Groton, in the State of Connecticut, for resale. The energy so sold was supplied from Respondent's substation at Montville, Connecticut, and was transmitted by means, partially, of such substation facilities, transmission lines (including a 33,000 volt transmission line owned and operated by the Respondent extending from Hallville, Connecticut, to the Trail's Corner substation of the Respondent at Groton), and the Trail's Corner substation facilities at Groton; also by an extension of that line to Groton Long Point and substation facilities at Groton Long Point owned and operated for parts of that period by Respondent.

[3694] (3) From and including August 26, 1935, until February 28, 1941, both inclusive, the Borough of Groton continuously sold to Fishers Island Farms, Inc., and its successor, The Fishers Island Electric Corporation (which corporations are hereinafter referred to without distinction as Fishers Island), a substantial portion of the electric energy which it purchased from the Respondent. Electric energy in substantial amount so purchased by Fishers Island was transmitted from Connecticut and distributed and sold at retail by Fishers Island in the State of New York. The Respondent had knowledge at all times since August 26, 1935, that the Borough of Groton sold to Fishers Island a substantial portion of the electric energy which it purchased from the Respondent and that energy in substantial amount so purchased by Fishers Island was transmitted from Connecticut and consumed in New York.

(4) From August 26, 1935, to February 28, 1941, both inclusive, the Respondent continuously owned and operated facilities at or near Groton and Montville, and between those places, used for the transmission of the electric energy sold to Fishers Island, as aforesaid, as distinguished from local distribution thereof.

(5) From August 26, 1935, to February 28, 1941, both inclusive, the Respondent owned and operated facilities at or near

Groton and Montville, and between those places, for the transmission and sale at wholesale of electric energy transmitted from the [3695] State of Connecticut and consumed in the State of New York by persons other than the transmitter thereof, which facilities were facilities for the transmission and sale at wholesale of electric energy in interstate commerce, and Respondent was, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act.

(6) Since prior to January 1, 1937, the Turners Falls Power & Electric Company, a Massachusetts corporation, and The Connecticut Power Company, a Connecticut corporation, have owned and operated a 66,000 volt double circuit line running from the former's substation at Agawam, Massachusetts, across the Connecticut-Massachusetts boundary to the 66,000 volt bus at the latter's South Meadow substation in Hartford, Connecticut. This double circuit line, known as the C-3 and D-4 lines, in Massachusetts is owned and operated by the Turners Falls Power & Electric Company and in Connecticut by The Connecticut Power Company. The Connecticut Power Company owns and operates a 66,000 volt line running from the 66,000 volt bus at its South Meadow substation to its hydro-electric generating plant at Falls Village, Connecticut, known and hereinafter referred to as the C.P. 1 and C.P. 2 lines. Recently the D-4 line and appurtenant facilities have been altered to operate at approximately 110,000 volts and that line is now connected through substation facilities of The Connecticut Power Company and The Hartford Electric Light Company to the C.P. 1 and C.P. 2 lines.

[3696] (7) The Connecticut Valley Power Exchange is an unincorporated voluntary association, consisting presently, and at all times since June 17, 1936 of The Connecticut Power Company, the Turners Falls Power & Electric Company, and the New England Power Company, which exchange surplus electric energy so that the lowest available incremental cost source is used in supplying their combined load. Electric energy is furnished to the

Exchange and paid for by the Exchange at the incremental cost to the supplying company and the Exchange in turn furnishes it to the receiving company and charges for it at the incremental cost to the receiving company of supplying an equivalent amount of energy from its own generating capacity. After payment of fixed charges and operating costs of the Exchange, the resulting savings are distributed by the Exchange to its members. In the operation of the Exchange electric energy which is transmitted from Massachusetts has regularly, frequently, for substantial periods of time, and in substantial amounts been, and continues to be, supplied to The Connecticut Power Company's South Meadow substation and to its C.P. 1 and C.P. 2 lines by means of the C-3 and D-4 lines, substation facilities, and other appurtenant facilities.

(8) At a point on The Connecticut Power Company's C.P. 1 and C.P. 2 lines, 11.04 miles from that company's South Meadow substation, a tap line 7.53 miles long runs to its West Side substation in Middletown, Connecticut. From the West Side substation [3697] a 13,800 volt line of that company extends to its Wolcott Lane substation in the town of Portland, Connecticut, and thence a similar line extended to that company's Pole 110 in the same town until after July 1, 1939.

(9) From January 1, 1937, to June 30, 1939, both inclusive, the Respondent purchased electric energy for its East Hampton Division in Connecticut from The Connecticut Power Company, supplied at Pole 110 in Portland, which electric energy regularly, frequently, and for substantial periods of time included electric energy in substantial amounts transmitted from Massachusetts by means of the aforesaid substation facilities and C-3, D-4, C.P.1, C.P. 2, tap, and 13,800 volt lines, and appurtenant facilities.

(10) From January 1, 1937, to June 30, 1939, both inclusive, the Respondent continuously owned and operated facilities in its East Hampton District and between that district and the aforesaid Pole 110 used for the transmission of electric energy purchased as aforesaid from The Connecticut Power Company, as

distinguished from local distribution thereof. Such facilities consisted of substation facilities for reducing voltage from 13,800 volts to 4,600 volts at Respondent's Leesville substation, and to 2,300 volts at its East Hampton, Colchester, Comstock Bridge, Collins Hill, and Westchester substations, and the 13,800 volt lines connecting them to the facilities of The Connecticut Power Company at Pole 110.

[3698] (11) From January 1, 1937, until June 30, 1939, both inclusive, the Respondent owned and operated facilities in its East Hampton District, and between that district and the aforesaid Pole 110, for the transmission of electric energy, transmitted from the State of Massachusetts and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were facilities for the transmission of electric energy in interstate commerce, and Respondent was, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act.

(12) At a point on The Connecticut Power Company's C.P. 1 and C.P. 2 lines known as Switching Tower 276, 39 miles from that company's South Meadow substation, a tap line 2.24 miles in length extends to the Torrington, Connecticut, substation of The Torrington Electric Light Company, a Connecticut corporation. At this substation The Connecticut Power Company maintains facilities for supplying electric energy from its C.P. 1 and C.P. 2 lines and that tap line to the 2,300 volt bus of The Torrington Electric Light Company. From January 1, 1937, to the date of the hearing The Connecticut Power Company sold electric energy to The Torrington Electric Light Company supplied from the former's C.P. 1 and C.P. 2 lines and the aforesaid tap line to the latter's 2,300 volt bus in its Torrington substation.

[3699] (13) From January 1, 1937, to June 17, 1941, both inclusive, the Respondent purchased, for its Winsted District, from The Torrington Electric Light Company, a substantial portion of the electric energy sold to that company by The Connecticut Power Company as aforesaid. That portion was supplied to the Respond-

ent from the 2,300 volt bus of The Torrington Electric Light Company's Torrington substation. The electric energy so purchased by the Respondent regularly, frequently, and for substantial periods of time included electric energy in substantial amounts transmitted from Massachusetts by means of the aforesaid substation facilities, C-3, D-4, C.P. 1, C.P. 2, and tap lines, and appurtenant facilities.

(14) From January 1, 1937, to June 17, 1941, both inclusive, the Respondent continuously owned and operated facilities in its Winsted District and between that district and the aforesaid 2,300 volt bus of The Torrington Electric Light Company used for the transmission of electric energy purchased, as aforesaid, from The Torrington Electric Light Company, as distinguished from local distribution thereof. Such facilities included a substation at Torrington with facilities for raising voltage from 2,300 to 27,600 volts, a substation at Winsted with facilities for lowering voltage from 27,600 to 4,600 volts, and a 27,600 volt double circuit wood pole line 10 miles or more in length, between those two substations.

[*3700*] (15) From January 1, 1937, to June 17, 1941, both inclusive, the Respondent owned and operated facilities in its Winsted District, and between that district and the aforesaid 2,300 volt bus of The Torrington Electric Light Company, for the transmission of electric energy transmitted from the State of Massachusetts and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were facilities for the transmission of electric energy in interstate commerce, and Respondent was, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act.

(16) At a point on The Connecticut Power Company's C.P. 1 and C.P. 2 lines, known as Tower 474, approximately 25 miles from that company's South Meadow substation, a tap line approximately 1.83 miles in length runs to the Respondent's substation in about the center of Bristol, Connecticut.

(17) On December 16, 1936, The Connecticut Power Company, as seller, and the Respondent, as buyer, entered into a contract

effective January 1, 1937, for a period of ten years for the supply of the entire requirements of the Respondent's Bristol District by The Connecticut Power Company. From January 1, 1937, to the present time, the Respondent has purchased and continues to purchase electric energy under that contract for its Bristol District supplied to [*3701*] its Bristol substation, which electric energy regularly, frequently, and for substantial periods of time, has included electric energy in substantial amounts transmitted from Massachusetts by means of the aforesaid substation facilities of The Connecticut Power Company, the C-3, D-4, C.P. 1, C.P. 2, and tap lines, and appurtenant facilities.

(18) From January 1, 1937, to the present time the Respondent has continuously owned and operated substation facilities in Bristol used for the transmission of electric energy, purchased as aforesaid from The Connecticut Power Company, as distinguished from local distribution thereof. Such facilities consist of leads from the aforesaid tap line which runs to the substation from the C.P. 1 and C.P. 2 lines, lightning arrestors, disconnects, oil circuit breakers, busses, step-down transformers, and appurtenant structures and facilities of the outdoor substation; a synchronous condenser and appurtenant facilities in the adjacent substation building; and facilities connecting the synchronous condenser with the outdoor substation facilities referred to.

(19) From January 1, 1937, to the present time the Respondent has continuously owned and operated and now owns and operates facilities in Bristol, Connecticut, for the transmission of electric energy, transmitted from the State of Massachusetts [*3702*] and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were and are facilities for the transmission of electric energy in interstate commerce and Respondent was and continues to be, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act.

(20) The respondent has omitted and failed to comply with the Commission's Order No. 42, adopted June 16, 1936, and effective

January 1, 1937; to comply with the Commission's order of May 11, 1937, concerning Electric Plant Instruction 2-D, Uniform System of Accounts; to comply with other orders supplemental to said Order No. 42; to comply with the accounting requirements and requirements incidental thereto prescribed by such orders; and to comply with numerous other orders and requirements prescribed by the Commission applicable to Respondent as a public utility.

OPINION

Our order of January 7, 1941, that the Respondent, The Connecticut Light and Power Company, show cause why it had not complied with numerous orders and requirements imposed by or pursuant to the Federal Power Act, followed Respondent's refusal to adopt the Commission's Uniform System of Accounts in its accounting and to submit proposals for reclassifying its accounts accordingly.

[3703] When the Federal Power Act became law on August 26, 1935, the Respondent made a gesture of terminating its transmission and sale of electric energy in interstate commerce. It was an expensive gesture—that is expensive ultimately to the electric rate payers—for it meant that they would no longer benefit from economies resulting from Respondent's participation in the Connecticut Valley Power Exchange.[1] But it was only a gesture, for while respondent did cut its interconnection near New Britain, Connecticut, with The Connecticut Power Company's Hartford-Falls Village transmission line, whereby it had exchanged electric energy with other members of the Exchange in Massachusetts and Connecticut, it did not cut other interconnections over which interstate energy flowed.

One such interconnection which was not severed was that with the Borough of Groton whereby Respondent supplied electric energy from its main interconnected transmission system to the

[1] In the twelve months ending August, 1935, when the Public Utility Act of 1935 became law, Respondent's share, alone, of Exchange savings amounted to more than $84,000.

Borough. The Borough in turn, admittedly within the knowledge of Respondent (Tr. 1905; 1914; 1679–1680; 394), transmitted and sold a substantial part of the electric energy which it purchased from Respondent to the electric utility serving customers on Fishers Island, New York, off the shore of Connecticut, by means of an interconnection at Groton Long Point in Connecticut and submarine cables.

[*3704*] Another such interconnection which Respondent did not cut at that time was at a point in the town of Portland, near Middletown, Connecticut, whereby it obtained energy from The Connecticut Power Company to serve its customers in East Hampton, Colchester, Leesville and vicinity. Neither did Respondent cut its interconnection at Torrington whereby it obtained energy from The Torrington Electric Light Company to serve its customers in Winsted and vicinity. (That company, in turn, obtained the energy from The Connecticut Power Company.) Nor did it cut its interconnection at Bristol whereby it obtained energy from The Connecticut Power Company to serve its customers there.

The Portland, Torrington and Bristol interconnections supplied Respondent's isolated systems at those points from The Connecticut Power Company's Hartford-Falls Village line already referred to, over which the Respondent had received energy from the Connecticut Valley Exchange. A transmission line from Agawam, Massachusetts, to Hartford, Connecticut, interconnected at Hartford with the Hartford-Falls Village line at all times since January 1, 1937.

In general, each of those three interconnections differed from that at New Britain in that Respondent could not at once arrange for any alternative supply of electric energy to take the place of those interconnections. At Groton, Respondent's contract [*3705*] was not terminable until April 1, 1940, and at Bristol not until January 1, 1947. At East Hampton and at Winsted, construction of alternative transmission lines to supply those areas from Respondent's main interconnected transmission system would have required several months to complete.

Under these circumstances, Respondent seems to have assumed that it had a choice of policies: (1) it could comply with all requirements under the Act until it should have severed those interconnections and thereby have ceased to own or operate facilities for the transmission or sale of electric energy in interstate commerce; or (2) it could carefully watch the administration of the Act in practice; could postpone outright refusal to comply by a temporizing attitude of responding in some fashion to those requirements of the Commission which did not involve any issue deemed important, thus deferring as long as possible a showdown on the jurisdictional question; and in the meantime it could move as rapidly as circumstances would permit and the assiduity (and availability of funds) of the Commission should dictate, to eliminate interconnections on which the Commission might, in practice, hold it to be a "public utility" under the Act.

That is to say, Respondent appears to have assumed that it had a choice of obeying the law or avoiding being caught. Respondent chose to try the latter alternative. It filed its [*3706*] Annual Report for 1937, but did so over four months late and without the form of verification required of "public utilities"; for 1938, but three months late and likewise without that verification; the same for 1939, with the further omission of the supplemental verification on oath by the president of the Respondent. Its record of filings of Power System Statements is similar, and necessary corrections were made only after repeated letters of inquiry by the Commission's staff. In another instance, the staff was still seeking to obtain typical bill data from the Respondent after all other companies in the country in the same category had filed their data. In July, 1941, at the hearing in the present proceeding, Respondent for the first time offered to comply with a request originally made December 2, 1938, for data on the effect of a flood, hurricane and tidal wave on electric service. Five months were consumed in responding to the Commission's inquiry of November 16, 1939, as to the status of the Respondent's original cost studies necessary to the required reclassification of its sys-

tem of accounts. Its response when finally made indicated that it would not comply with accounting requirements of this Commission.

Meanwhile, on July 1, 1939, Respondent severed its interconnection in the town of Portland, "one of the considerations" for so doing admittedly (Tr. 966) being its policy to avoid being held by this Commission to be engaged in interstate commerce.

[*3707*] When the contract with the Borough of Groton expired in 1940, Respondent would not enter into a new contract while the Borough continued to sell to the Fishers Island company. This was done, admittedly (Tr. 967), in accordance with Respondent's policy to avoid being held by this Commission to be engaged in interstate commerce. Sales by the Borough to the Fishers Island company actually stopped within two months after we issued our show cause order initiating this proceeding.

Finally, on June 17, 1941, less than three weeks before the hearing in this proceeding, Respondent ceased to receive electric energy at Torrington supplied from the Hartford-Falls Village line, shortly after Commission staff engineers showed interest in the Torrington interconnection by a visit to Torrington in the course of their investigation of Respondent's facilities. To procure a temporary alternative supply of electric energy for Winsted Respondent agreed to pay The Torrington Electric Light Company extra to supply electric energy generated by that company's steam generators in Torrington which were normally not operated theretofore. Special temporary connections were made in the Torrington substation to do this in such a way as to avoid intermingling the electric energy so produced with that still supplied to The Torrington Electric Light Company for its own needs from the Hartford-Falls Village line. Switches in the substation circuits [*3708*] whereby Respondent had formerly been supplied from that line were opened. Here again an admitted purpose (Tr. 181; 191–192) was to avoid being held by the Commission to be engaged in interstate commerce.

We are not satisfied that the mere opening of switches and

utilization of an alternative (and, as the evidence shows, unreliable) intrastate source of supply over temporary facilities is sufficient to terminate the status of Respondent's Torrington-Winsted facilities as facilities for the transmission of electric energy in interstate commerce. From another view, the facilities formerly used may now be permanent facilities for emergency use and, not having been authorized by this Commission under the last clause of Section 202(d), may be sufficient to establish jurisdiction to the present time. However, in view of other facts in the case, we have not undertaken to decide that question.

Only at Bristol, where Respondent's contract still had some time to run, had Respondent, at the opening of the hearing, not severed its interconnections over which interstate energy flowed.

By discontinuing these interconnections or interstate transactions by means thereof, at Groton, Portland, and Torrington, Respondent impliedly recognized that it had beeen subject or at least that it probably would be held to be subject to the regulatory provisions of the Act; *i.e.*, that there was interstate energy [*3709*] supplied at those interconnections, and that Respondent owned or operated facilities for the transmission of that energy. The record confirms those facts.

At Groton Respondent admits, as we have said, the out-of-state destination of electric energy continuously supplied in sufficient amounts to meet the needs of the customers on Fishers Island from before the enactment of the Act until February, 1941. At the other interconnections the testimony of Commission staff engineers based on a study of transactions beginning January 1, 1937, establishes that regularly, frequently, for substantial periods of time, and in substantial amounts, electric energy generated in Massachusetts was supplied to Respondent for distribution and sale to its customers in Connecticut, sometimes mixed with energy generated in Connecticut, sometimes not mixed. That is to say, at times, electric energy generated in Massachusetts, alone, was supplying Respondent's loads at those interconnections.

The record also establishes that Respondent owned and operated facilities for the "transmission" of that interstate energy. In considering this subject it is necessary to examine somewhat closely the scope of "transmission of electric energy in interstate commerce" within the purview of the Act (as distinguished from "generation" at the one end and "local distribution" at the other). The Federal Power Act declares that "electric energy [*3710*] shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof." Such transmission, in our opinion, extends from the generator, where generation is complete,[1] to the point where the function of conveyance in bulk over a distance, which is the essential characteristic of "transmission", is completed and the process of subdividing the energy to serve ultimate consumers, which is the characteristic of "local distribution", is begun[2]. This necessarily implies and requires that the facilities (substations, including transformers and other equipment) that are required to raise the voltage (and reduce the current) so that energy may be transmitted in bulk with minimum line losses; the facilities (lines) that actually convey the energy in bulk from point to point; and the facilities to lower the voltage (and raise the current) again, so that the energy may readily be subdivided and distributed, are facilities for transmission. In the same category of transmission facilities are the several devices used for metering and controlling the flow of bulk energy; the devices, such as synchronous condensers, for limiting the loss of voltage and energy in the line; devices for weather protection; and the devices which are necessary to keep the [*3711*] parts of the interconnected system or systems "in tune" and prevent actual physical disruption or faulty operation of the delicately balanced apparatus which makes it possible for electric energy to perform its miracles.

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[1] *Utah Power & Light Co.* v. *Pfost,* 286 U.S. 165, 181.

[2] *Southern Gas Corp.* v. *Alabama,* 301 U.S. 148, 155; *East Ohio Gas Co.* v. *Tax Commission,* 283 U.S. 465, 471.

This fundamental conception of the essential component facilities for the electrical transmission of energy will be clarified if we consider what would have to be done, what facilities would have to be added if the generator located in the heart of a local distribution system were removed to a distant point. Respondent's own engineering and expert witnesses corroborated the testimony of the Commission engineers, that in such a case it would be necessary to add to the facilities for generation and for local distribution a step-up substation, a transmission line and a step-down substation. These facilities are necessarily used where electric energy in bulk is commercially conveyed over a distance too great for economical conveyance at generator voltage.

In the case of telegraph and telephone the Courts have long recognized that, where interstate transmission is involved, the facilities for such transmission include not only the sending devices, and the interstate wires, but also the facilities at the receiving end. *Western Union Telegraph Co.* v. *Foster,* 247 U.S. 105; see *Western Union Telegraph Co.* v. *Pendleton,* 122 U.S. 347; *Smith* v. *Illinois Bell Telephone Co.* (1930) 282 U.S. 133, 150. The complete absence of interstate wires in radio transmission does not [*3712*] alter the situation. *United States* v. *American Bond & Mortgage Co., et al.* (D.C., N.D. Ill., E.D., 1929), 31 F. 2d 448, 454; *National Broadcasting Co., Inc.* v. *Board of Public Utility Com'rs of New Jersey, et al.* (D.C., D.N. Jer. 1938), 25 F. Supp. 761, 763.

In view of the skepticism and unbelief with which the world received the announcement of the possibility of electrical communication by "wireless", which is now accepted as commonplace, it would be rash to assume that the transmission of electric energy for motors, heaters and lights will never be freed of the limitations of present day transmission lines. If that should take place, clearly it could not be contended that the mere elimination of the lines would mean that the electric energy was no longer transmitted in interstate commerce, or that the "transmitter" and

other devices by which such energy would be sent and received would not be regarded as "facilities for transmission".

Upon the record before us, we are constrained to hold that "facilities for transmission" include not merely the wires by which energy is conveyed in bulk over a distance but all the devices necessary and useful to accomplish that conveyance.

This is not to say that there may not be transmission where there is no stepping up of the voltage by transformers. Generator voltages may be high enough for transmission over some distances. It does mean that, where transformers or other auxiliary devices are necessary or are used to make the transmission of [*3713*] electric energy in bulk over a distance commercially feasible, such devices must be classified as facilities for transmission. Thus the facilities for raising the voltage at which energy is supplied to a line (as at Torrington) and for lowering the voltage at which energy is received from the line, as at Winsted, at East Hampton and other points in that vicinity, at Bristol, and at Fishers Island, come within this classification.

We have, therefore, concluded with respect to the energy transactions at Groton, for example, that the electric energy consumed by customers on Fishers Island in New York was transmitted from Respondent's generators in Connecticut, through its step-up substation, and 33 Kv transmission lines to Groton Long Point; thence by 33/6.9 Kv step-down transformers (owned by Respondent for a short time after the enactment of the Act), 6.9 Kv line owned by the Borough, 6.9 Kv submarine cables across the Connecticut-New York boundary, and other facilities owned by the Fishers Island company (including further step-down transformers) to the points at which subdivision marks the beginning of local distribution on Fishers Island; and that the facilities between the generators and the points at which local distribution begins are facilities for transmission of electric energy in interstate commerce, regardless of changes in title or custody, en route. *Illinois Natural Gas Co.* v. *Central Illinois Public Service Co.*, 314 U.S.—, (decided January 5, 1942), and cases there

cited; [3714] *People's Natural Gas Company* v. *Federal Power Commission* (Ct. of App., D.C. No. 8048, decided April 13, 1942).

We may point out that pursuant to an application made by the company serving Fishers Island we have heretofore, under Section 203 of the Federal Power Act, authorized and approved the sale of the part of such facilities owned by that company, as being subject to our jurisdiction. (*Application of Fishers Island Farms,* Docket No. IT-5645, October 15, 1940).

We turn now to the defenses by which Respondent seeks to justify its conduct. It contends that its sale of electric energy to the Borough of Groton was not a "sale at wholesale" because made to a municipality, and it cites the definitions in the Act of the terms involved. We have previously explained our reasons for rejecting such a contention. See our Opinion No. 43, *City of Los Angeles, et al.* v. *The Nevada-California Electric Corporation,* Docket No. IT-5512, January 25, 1940, and Opinion No. 45, *In the Matter of Otter Tail Power Company,* Docket No. IT-5544, May 1, 1940. As this contention is based solely upon the definitions of "sale at wholesale", it obviously cannot apply to "transmission in interstate commerce" even though such transmission is to a municipality.

Respondent's contentions that it is subject to regulation by the Public Utilities Commission of the State of Connecticut and therefore not subject to the regulation provided by the Federal [3715] Power Act must be rejected. *Northwestern Electric Company* v. *Federal Power Commission* (C.C.A. 9th, No. 9756, February 13, 1942); *In the Matter of The Hartford Electric Light Company,* Docket No. IT-5560, decided October 21, 1941, reaffirming decision of February 25, 1941; Opinions Nos. 58-A and 58.

Respondent also repeats the argument, rejected in our decision last referred to, that transformers bring about such a change in the identity or form of electric energy that they mark the terminus of the interstate commerce in the electric energy which crosses

the State boundary. Nothing in this record alters our opinion already expressed that this contention is untenable.[1]

Finally, we notice the contention that transmission of electric energy from points of generation in Massachusetts to points of utilization in Connecticut is not "uniquely demonstrable", cannot be verified by physically observable facts, and hence that the jurisdiction of this Commission cannot be "proved". The contention seeks to exploit the fact that electric [*3716*] energy is not in itself susceptible to direct physical observation.

Respondent's expert witnesses admit that where the readings of watt or watt-hour meters are verifiable by physically observable facts, as at generators and at consumers' appliances where the equivalent mechanical or heat energy can be physically measured and compared with the watt and watt-hour meter readings, such readings are "provably" accurate. They do not claim that there is any more reason for doubting their accuracy at other points, but merely that that accuracy cannot be proved at other points as it can be at generators and at consumers' appliances—or rather, cannot be proved in the absolute sense which Respondent's contention assumes and seeks to have us accept as necessary. But such a degree of proof—proof beyond *any* doubt, reasonable or unreasonable—is not required.

The conception advanced by Respondent's expert witnesses that over and above the flow of electric energy on a circuit shown by watt and watt-hour meters there may be postulated other flows and counterflows not shown by the meters, is wholly supposititious and not supported by the commercial practice of the electric utility industry. That practice is to accept such meter readings as showing the direction in which electric power or energy is supplied, and the total amount supplied, as a basis of payment

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[1] See: *Utah Power & Light Co.* v. *Pfost*, 286 U.S. 165, 172, 181; *Mill Creek Coal & Coke Co.* v. *Public Service Commission*, 84 W. Va. 662, 100 S.E. 557, 560–561; *Western Union Telegraph Co.* v. *Foster*, 247 U.S. 105, 112–113; *Illinois Natural Gas Co.* v. *Central Illinois Public Service Co.*, 314 U.S. (decided January 5, 1942).

for energy bought and sold in the countless [*3717*] transactions upon which the industry's revenues depend. Utilizing the same showings, by such meters, of direction and amount of flow of energy at points on the circuit from Massachusetts to the Portland, Torrington and Bristol interconnections and on each tap where energy might leave or enter the circuit, Commission staff engineers "traced" the flow of electric energy from Massachusetts to each of those interconnections. In so doing they were using meter readings at each point for the same purpose for which such readings are commonly used in the industry, *i.e.*, to show direction and amount of flow of energy. Their reliability for those purposes in the commercial transactions of the industry is a sufficient guarantee of their reliability and appropriateness for the same purposes in the regulation of the industry.

We find significant confirmation of the traceability of electric energy in the testimony of the engineer who had been the manager of The Connecticut Valley Power Exchange for fifteen years. He explained that the operations of that Exchange are scheduled so that the lowest incremental cost energy available from the combined generating facilities of the members of the Exchange is utilized to supply their combined loads. To determine which particular generator shall be used, however, it is necessary, according to his testimony, to take into account not merely the incremental cost of generation of energy at the generator [*3718*] in question but also the energy losses entailed in the transmission of that energy over the transmission facilities used to supply the particular load it will carry.

The fact that the actual utility operations by which energy is supplied to Respondent's facilities over the interconnections in question, are scheduled on a basis which takes into account energy losses entailed by the flow of energy from a particular generator over a particular path to a particular load demonstrates that for practical purposes the flow of energy *is* traced, notwithstanding the testimony of Respondent's experts that such tracing is not "uniquely demonstrable by physically verifiable facts".

That Respondent's expert and other witnesses did not testify that the method of tracing the flow of electric energy used by the Commission's staff engineers was erroneous, is, under the circumstances, highly significant.

It appears, from the record before us, that the views of Respondent's experts were limited to observing solely the mathematical equality, or lack of equality, of generation and load. Such a method, it was admitted, would permit allocating to a generator in Hartford, Connecticut, the supply of a load in Shanghai, China, and to the Shanghai generator the supply of the load in Hartford, if such equality were observed, notwithstanding the fact that the Hartford generator appears to be electrically connected [*3719*] to the load in Hartford and the Shanghai generator to the load in Shanghai, while there appears to be no electrical connection between Shanghai and Hartford. An expert's opinion which regards such an unreal postulate as equally valid with the conclusion that the respective loads are carried by the local generators, as shown by meters on the connecting electric circuits, appears to us wholly worthless for the practical purpose of administering the Federal Power Act.

The Commission, in its initial cases involving the determination of its jurisdiction, has admitted such testimony at great length, not only in an excess of "due process" caution, but also to give abundant opportunity for testing these contentions. Patience may, however, cease to be commendable.[1] The courts will not condone the unrestrained augmentation of the record which they must consider. We think that the results in this case demonstrate that it may be necessary hereafter to apply reasonable limits to the testimony of so-called "experts".

It is abundantly clear that Respondent was a "public utility" on June 16, 1936, when our Order No. 42 prescribing the Uniform System of Accounts for public utilities was issued; on January 1,

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[1] *Cf. Alabama Power Company* v. *Federal Power Commission,* (U.S. Ct. of App., D.C., March 30, 1942).

1937, when it became effective; on May 11, 1937, when we issued our further order with respect to Electric Plant Accounts [*3720*] Instruction 2-D of the Uniform System of Accounts, and continuously through January 1, 1939, when reclassification of accounts in accordance with the foregoing orders was required to be completed; that there was no excuse for its failure to comply; and that it should be required to make good its omission without further delay and as of the time compliance was originally required.

An order will issue accordingly.

LELAND OLDS, *Chairman*
CLAUDE L. DRAPER, *Commissioner*
BASIL MANLY, *Commissioner*
JOHN W. SCOTT, *Commissioner*
CLYDE L. SEAVEY, *Commissioner*

Dated at Washington, D. C. this 15th day of May, 1942.

J. H. GUTRIDE
Acting Secretary

[*3721*] UNITED STATES OF AMERICA.
FEDERAL POWER COMMISSION.

Commissioners

Leland Olds, Chairman, Claude L. Draper, Basil Manly, John W. Scott and Clyde L. Seavey.

May 15, 1942.

DOCKET NO. IT-5665

In the Matter of

THE CONNECTICUT LIGHT AND POWER COMPANY

ORDER REQUIRING COMPLIANCE WITH ORDER NO. 42 AND ORDERS SUPPLEMENTAL THERETO.

Having on this date made and entered its findings and opinion (Opinion No. 75) in the above-entitled matter, hereby incorporated by reference as a part hereof, the Commission *orders* that:

(A) The Respondent is hereby required to comply with the aforesaid Order No. 42, order of May 11, 1937, and other orders supplemental to said Order No. 42; and to comply with the accounting requirements prescribed thereby, applicable to it as a public utility within the meaning of that term as used in that Act, as of the effective dates of such orders.

(B) The Respondent shall, within 90 days from the date of this order, file the data and information required by Electric Plant Accounts Instruction 2-D of the Uniform System of Accounts, and the aforesaid order of May 11, 1937.

By the Commission.

J. H. GUTRIDE,
Acting Secretary.

* * * * * * [3771]

UNITED STATES OF AMERICA.
FEDERAL POWER COMMISSION.

Commissioners

Leland Olds, Chairman, Claude L. Draper, Basil Manly and Clyde L. Seavey.

June 23, 1942

DOCKET NO. IT-5665.

In the Matter of

THE CONNECTICUT LIGHT AND POWER COMPANY

ORDER MODIFYING ORDER OF MAY 15, 1942, AND OTHERWISE DENYING PETITIONS FOR REOPENING, REHEARING AND STAY.

Upon the Petition for Reopening the Proceeding to Take Further Evidence and the Petition for Rehearing and Stay of Order, filed June 13, 1942, by The Connecticut Light and Power Company, Respondent in the above-entitled proceeding, with respect to the Commission's Findings, Opinion and Order of May 15, 1942;

It appearing that:

(a) The alleged facts which Respondent seeks opportunity to show by reopening the proceeding are irrelevant to the Findings and Order entered May 15, 1942, in the above-entitled proceeding;

(b) It is necessary to carry out the provisions of the Federal Power Act and in the public interest that all "public utilities" under the Federal Power Act reclassify their accounts and maintain their accounts in accordance with the Uniform System of Accounts and other requirements prescribed by the orders referred to in the aforesaid order of May 15, 1942, without any delay not reasonably necessary, and this applies as to the Respondent from and after the date upon which the Commission's

determination that Respondent is such a "public utility" shall have become finally effective;

(c) With respect to the aforesaid Findings and Order of May 15, 1942, as modified hereby, no facts have been presented or alleged in support of the application for rehearing which would justify vacating, setting aside, annulling, or staying the same, and no principles of law or contentions stated which were not fully considered by the Commission before it entered its aforesaid Findings, Opinion and Order;

[3772] The Commission *orders* that:

(A) Paragraph (B) of the aforesaid order of May 15, 1942, is modified to read as follows:

"(B) Within 60 days after the date hereof as modified (June 23, 1942), if no proceeding for review of this order shall duly have been commenced in a Court of competent jurisdiction, or, if such a proceeding shall be commenced, then within 60 days after the judgment and decree of such Court shall have become finally effective, affirming this order, Respondent shall commence the studies and work necessary to comply with this order and shall thereafter prosecute and complete the same within such period of time as the Commission shall determine to be reasonable."

(B) Respondent's aforesaid Petition to Reopen the Proceeding and Petition for Rehearing and Stay of Order, otherwise than as provided in paragraph (A) hereof, be and they hereby are denied.

By the Commission.

LEON M. FUQUAY, *Secretary.*

* * * * * * [97]

STIPULATION.

In accordance with and subject to the Rules of Practice and Regulations of the Federal Power Commission, as amended, it is hereby stipulated by and between counsel for The Connecticut Light and Power Company (hereinafter sometimes referred to as the Respondent) and counsel for the Federal Power Commission (hereinafter sometimes referred to as the Commission) as follows hereinafter, subject, however, to the reservation that counsel for the Respondent or counsel for the Commission may object to the admissibility of any part of this stipulation on the ground that it is immaterial or irrelevant:

1. Except as otherwise specifically appears hereinafter, the statements in paragraphs 2 to 6 hereof, inclusive, and 47, were true as to all times since August 26, 1935, and the use therein of the present tense shall be understood to include the entire period since August 26, 1935.

2. The Respondent is a corporation organized and existing by virtue of special acts of the General Assembly of the State of Connecticut. Its principal executive offices are at 36 Pearl Street, Hartford, Connecticut.

3. The Respondent, until about April 18, 1941, was a subsidiary company of a registered holding company (The United Gas Improvement Company) as defined in the Public Utility Holding Company Act of 1935 and also a subsidiary, as that term is defined in that Act, of the United Corporation, a registered holding company.

4. The business done by the Respondent consists principally of the production, purchase, transmission, distribution, and sale of electric energy and gas for residential, commercial, industrial, and municipal purposes and the sale of electric energy at wholesale in the State of Connecticut. Since its organization, the Respondent has acquired by purchase, by merger, or under lease

the properties and franchises of numerous electric and gas companies in the area now embraced within the Respondent's territory. The territory served by the Respondent with electric energy or gas, or both, covers approximately 3,235 square miles with a population of about 703,000 based on the 1940 Federal census, not [98] including the territory served by other Connecticut companies and municipalities purchasing substantially all of their requirements from the Respondent.

5. Electric service is supplied by the Respondent in 107 towns, cities or boroughs of Connecticut with a population of about 660,000 based on the 1940 Federal census, not including a population of about 130,000 served by other Connecticut companies and municipalities purchasing substantially all of their electric energy requirements from the Respondent. The territory served directly by the Respondent covers a substantial part of the State of Connecticut, including the cities of Bristol, Meriden, New Britain, Norwalk, Putnam, Rockville, Waterbury, Willimantic and Winsted. Electric energy is supplied at wholesale to certain other companies and municipalities. Approximately 80 per cent of the electric energy requirements of the Respondent is produced by it the balance being purchased from other companies.

6. A substantial part of the properties of the Respondent is held under a 999-year lease from Connecticut Railway & Lighting Company expiring in the year 2905. The rest of the property operated by the Respondent is directly owned by it. All of the property of the Respondent, including that held under the 999-year lease is located wholly in the State of Connecticut.

7. The Commission adopted and promulgated its Order No. 42 on June 16, 1936, prescribing a "Uniform System of Accounts for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act, Effective January 1, 1937". Said System of Accounts provided that the System of Accounts thereby prescribed should be applicable among others to "public utilities, as herein defined". It contained the following definition: " 'Public utility' means any person who owns or operates facilities sub-

ject to the jurisdiction of the Commission under the Federal Power Act. (See section 201(e) of said act.)" Said System of Accounts provided that it should apply, among others, to such utilities having annual electric operating revenues of $750,000 or more determined as therein provided. The annual electric operating revenues of the Respondent so determined have been in excess of $750,000 at all times since the adoption of Order No. 42.

8. A copy of the Commission's Order No. 42 and two printed copies of the "Uniform System of Accounts Prescribed for Public Utilities and Licensees Subject to the Provisions of the Federal Power Act" were mailed to the Respondent on October 19, 1936, at its proper address and in regular manner.

[99] 9. The Commission adopted and promulgated its Order No. 43 on December 31, 1936, prescribing certain amendments to the Uniform System of Accounts prescribed by Order No. 42.

10. On January 6, 1937, a copy of the Commission's Order No. 43 and a copy of the amendments prescribed thereby to the Uniform System of Accounts were mailed to the Respondent by registered mail and a receipt therefor by the Respondent was returned to the Commission.

11. The Commission adopted and promulgated its Order No. 42-A on July 11, 1939, supplementing the text of the account entitled "Electric Plant Acquisition Adjustments" of the Commission's Uniform System of Accounts.

12. On July 19, 1939, a copy of the Commission's Order No. 42-A was mailed to the Respondent by registered mail and a receipt therefor by the Respondent was returned to the Commission.

13. The Commission adopted and promulgated its Order No. 45 on January 13, 1937, prescribing a list of units of property for use in connection with the Commission's Uniform System of Accounts.

14. A copy of the Commission's Order No. 45 and a copy of the list of units prescribed by that Order were mailed to the Re-

spondent on January 22, 1937, by registered mail and a receipt therefor by the Respondent was returned to the Commission.

15. The Respondent has not complied and is presently not complying with the Commission's Orders No. 42, 42-A, 43 and 45.

16. The Commission adopted and promulgated its Order entitled "Electric Plant Instruction 2-D—Uniform System of Accounts" on May 11, 1937, prescribing certain additional requirements with respect to the submission of data required by that Instruction.

17. An employee of the Federal Power Commission who was at the time employed in what was known as the "Records Section" of the Secretary's office would testify that she and another employee of the "Records Section" were present when copies of the aforesaid order of May 11, 1937, together with letters of transmittal thereof dated May 22, 1937, signed by Leon M. Fuquay, Acting Secretary, and addressed "To all Public Utilities", were placed in franked white envelopes which had been addressed to numerous companies and the envelopes sealed; that she thereupon [*100*] prepared a list of the addressees to whom such envelopes were respectively addressed, by copying the name and address which appeared on each of those envelopes as they appeared there; that she and the other employee then re-checked the list against the envelopes and found it accurate, after which she attached the said list to a copy of the aforesaid letter and order; that she and the other employee then bundled the said envelopes together and took them to the Commission's mailing room and that the list and attached copy of letter and order were sent to the Commission's files.

An employee of the Federal Power Commission who was at the time employed in the Commission's mailing room would testify that on receipt of such bundles of envelopes in the Commission's mailing room it was the regular and established practice of himself and others employed in the mailing room, after weighing them in gross, to place them in mail sacks and close the sacks, whereupon the closed sacks were taken by messenger of the Federal Power

Commission to the Post Office and there deposited for delivery to the addressees.

A file designated as "File No. 64-2a Original Cost under Electric Plant Instruction 2-D, Miscellaneous" of the Commission's official files, contains a copy of said order of May 11, 1937, and said transmittal letter of May 22, 1937, to which is attached a list of companies including the following: "Connecticut Light & Power Co., The; 36 Pearl St., Hartford, Conn." Such copies and list record the mailing of such order and letter of transmittal to the companies appearing on such list at the addresses given, under and in accordance with the regular and established practices of the Federal Power Commission.

18. The Respondent has not complied with and is presently not complying with the Commission's Order of May 11, 1937, entitled "Electric Plant Instruction 2-D—Uniform System of Accounts."

19. The Commission adopted and promulgated its Order No. 36 on December 16, 1935, relating to the filing of rate schedules under Section 205 of the Federal Power Act and monthly reports in connection therewith and on February 4, 1936, the Commission amended its Order No. 36 in certain respects and readopted and promulgated said order.

20. On December 21, 1935, a copy of the Commission's Order No. 36 was mailed to the Respondent by registered mail and a receipt therefor was returned to the Commission.

21. The Commission adopted and promulgated its Order No. 44 on December 31, 1936, prescribing Rules of Practice and Regulations with approved forms revised to January 1, 1937, and [*101*] rescinding Order No. 36. Rule 205, thereby prescribed related to the filing of rate schedules under Section 205 of the Federal Power Act and monthly reports in connection therewith.

22. On January 22, 1937, a copy of the Commission's Order No. 44 and of the Rules of Practice and Regulations, With Approved Forms prescribed thereby were mailed to the Respondent

by registered mail and a receipt therefor by the Respondnt was returned to the Commission.

23. The Commission adopted and promulgated its Order No. 50 on April 19, 1938, prescribing Rules of Practice and Regulations, With Approved Forms (Effective June 1, 1938, to supersede the Rules of Practice and Regulations, with Approved Forms prescribed by the Commission's Order No. 44. Part 35 of the Rules of Practice and Regulations so prescribed related to the filing of rate schedules under Section 205 of the Federal Power Act and monthly reports in connection therewith.

24. On May 27, 1938, a copy of the Rules of Practice and Regulations prescribed by the Commission's Order No. 50 was mailed to the Respondent by registered mail and a receipt therefor by the Respondent was returned to the Commission.

25. The Respondent has never filed any rate schedule or made any report on any form prescribed by Orders Nos. 36, 44 and 50.

* * * * * * [*104*]

47. The State of Connecticut has a commission known and designated as the Public Utilities Commission.

* * * * * * [*105*]

52. The terms and conditions of the Commission's orders hereinbefore referred to and the requirements thereby prescribed may be noticed by the Commission and by any court on any review of the above entitled proceeding, as though set forth herein.

* * * * * * [*111*]

54. Annexed hereto are true photostatic copies of the following described documents which are hereby incorporated in evidence:

[*112*] Agreement dated March 31, 1930, between The Connecticut Light and Power Company and the Borough of Groton.

Agreement dated June 5, 1935, between The Connecticut Light and Power Company and the Borough of Groton, said agreement amending the agreement of March 31, 1930.

Memorandum of agreement dated November 15, 1935 between

the Borough of Groton and The Connecticut Light and Power Company.

Agreement dated June 15, 1935 between the Borough of Groton and the Fishers Island Farms, Inc.

Letter dated August 1, 1939 from The Connecticut Light and Power Company to Mr. A. N. Tiffany, Jr., Superintendent of Water and Electric Department of the Borough of Groton.

Letter dated August 2, 1939 to H. D. Larrabee, Manager of The Connecticut Light and Power Company from A. N. Tiffany, Jr., Superintendent of Water and Electric Department of the Borough of Groton.

Letter dated September 27, 1939 from The Connecticut Light and Power Company to the Board of Utility Commissioners of the Borough of Groton giving notice of intent to cancel agreement of March 31, 1930, effective September 29, 1940.

Letter dated June 14, 1940 from The Connecticut Light and Power Company to Mr. A. N. Tiffany, Jr., Superintendent of the Water and Electric Department of the Borough of Groton.

Letter dated December 15, 1939 from the Water and Electric Department of the Borough of Groton to Mr. Henry L. Ferguson of Fishers Is. ! Farms, Inc.

Letter dated December 16, 1939 from Fishers Island Farms, Inc. to Mr. A. N. Tiffany, Jr., Superintendent of the Water and Electric Department, Borough of Groton.

Letter dated June 4, 1940 from Mr. A. N. Tiffany, Jr., Superintendent of the Water and Electric Department, Borough of Groton to Mr. H. L. Ferguson, President of Fishers Island Farms, Inc.

Letter dated June 6, 1940 from Fishers Island Farms, Inc. to Mr. A. N. Tiffany, Jr., Superintendent of Water and Electric Department, Borough of Groton.

Letter dated October 17, 1940 from Mr. A. N. Tiffany, Jr., Superintendent of Water and Electric Department, Borough of Groton to Leon M. Fuquay, Secretary of the Federal Power Commission.

The Respondent in making this stipulation reserves the right

to contest on any constitutional or any other ground whatever the validity, scope and applicability to it of any or all of the rules, regulations or orders promulgated or adopted by the Commission [*113*] and purported to be made under the authority granted it by the Federal Power Act. By making this stipulation the Respondent does not admit the jurisdiction of the Commission over it or the jurisdiction or the power of the Commission to hold the hearing instituted by the order to show cause in the above-entitled matter.

[Signatures of counsel omitted.]

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* * * * * * [*234*]

THIS AGREEMENT made this 31st day of March, 1930, by and between The Connecticut Light & Power Company, Incorporated under the laws of the State of Connecticut, hereinafter called The Power Company and The Borough of Groton, Connecticut, acting by and through its Board of Water Commissioners, duly authorized thereto (hereinafter called The Consumer) for themselves, their successors and assigns—

WITNESSETH:

That for and in consideration of One Dollar and other good and valuable considerations paid by each to the other, receipt of which is hereby acknowledged, the parties hereto do hereby agree each with the other as follows:

That the Power Company shall deliver to The Consumer and the Consumer shall receive and pay to the Power Company for electrical energy under the following terms and conditions:

1. *Term:* This agreement shall become effective April 1st, 1930, and shall remain in full force and effect until April 1st, 1940, unless sooner terminated by consent of both parties hereto. After April 1st, 1940, this agreement shall continue in full force and effect until terminated by either party upon one year's prior written notice to the other party. This agreement replaces agreement dated October 30th, 1918, be-

tween the Shore Line Electric Railway Company and the Borough of Groton; also one dated May 11th, 1922, between The Eastern Connecticut Power Company and the Borough of Groton, which agreements are cancelled by mutual consent.

2. *Lines and Equipment:* The Power Company shall deliver the electrical energy herein contemplated at its substation located near Trail's Corner in the Town of Groton, at Groton Long Point in the Town of Groton and at such other points as may be mutually agreed upon.

The Power Company shall provide and maintain the lines, meters, transformers, switches and other sub-station equipment necessary for said delivery and measuring of electrical energy.

[235] 3. *Delivery and Metering:* The delivery points shall be: the low tension terminals of transformers now installed, or of other transformers in substitution therefor, at the above mentioned substation of the Power Company at Trail's Corner in the Town of Groton; the end of its existing 33,000 volt transmission line at Groton Long Point and such other points as may be mutually agreed upon.

Energy shall be metered on the high tension side of the transformers at each point of delivery.

Energy shall be three phase sixty cycle at a nominal potential of 33,000 volts, or such other voltage, at the metering point, as may be agreed upon. Except under abnormal conditions shall frequency vary more than one cycle above or below sixty cycles per second, nor shall potential vary beyond the limits of commercial feeder regulators, available at the date of this agreement.

All meters and equipment used for the purposes of this agreement shall be accessible at all reasonable times to both parties for inspection and reading; provided, however, that meter seals shall not be broken except in the presence of representatives of both parties unless the party not represented shall have consented thereto.

Any meter found to be not more than two per cent above or below correct registration or indication shall be considered as correct as to bills previously rendered, but shall after test be adjusted to as near correct performance as is commercially possible. Should the error be found greater than two per cent but less than ten per cent a correction shall be made to effect the inaccuracy found, provided that such correction shall not cover a period greater than thirty days previous to the date of making the test at which such inaccuracy is found. Should such error be found to be greater than ten per cent, adjustment shall be made by agreement by the parties hereto or by arbitration. Meters shall be regularly tested at periods not exceeding twelve months, but special tests may be made at [*236*] any time upon request of either party provided that both parties are represented at such special tests. Tests which do not require meter seals to be broken may be made at any time by either party and the cost thereof shall be borne by the party making such test. The cost of all other tests both regular and special shall be borne by the Power Company except when on special tests the meter and equipment shall be found to be more than two per cent slow, the cost of the test in such case shall be borne by the Consumer.

4. *Service:* The Power Company agrees to deliver such energy as may be required by the Consumer at Trail's Corner up to 1500 KVA without notice and 500 KVA at Groton Long Point. The amount of energy may be increased upon request of the Consumer after notice of sufficient length to allow the Power Company a reasonable time in which to provide the necessary new or additional equipment: provided that the Power Company shall be reimbursed by the Consumer for expenditures which, by request of the Consumer, it (the Power Company) may have been called upon to make within two years previous to any termination of this agreement.

5. *Price and Payment:* The service rendered and energy supplied under this agreement by the Power Company shall be charged to and paid by the Consumer as follows:

The total charges shall consist of an investment charge, plus a demand charge, plus an energy charge. The monthly investment charge shall be 1/12 (one twelfth) of 11% of the actual investment in substation equipment and lines furnished to supply the Consumer. The Consumer may purchase at its original cost the substation equipment at any time during the term of this agreement, and thereafter be relieved of paying the investment charge.

The Demand Charge shall be $1.50 per month per KW of 30 minute maximum demand.

The Demand Charge shall be based upon a demand of not less [237] than 75% of the maximum of any of the preceding eleven months, but in no case shall it be taken at less than 500 KW. The Demand shall be taken as the sum of the monthly demand readings at the individual substations.

The Energy Charge shall be—

9 mills for each of the first 100,000 KWH taken in the month
8 " " " " " next 100,000 " " " " "
7 1/2 mills for each KWH in excess of 200,000 KWH taken in the month. The Energy Charge is based upon a cost of coal or equivalent fuel of $4.00 per gross ton, as unloaded from cars or barges at the steam power plant of the Power Company at Montville, Connecticut. The Energy Charge shall be increased at the rate of one mill per KWH per dollar by which the actual cost of said fuel exceeds said $4.00 per gross ton.

The Minimum bill in any month shall be the investment charge plus the minimum demand charge.

Bills covering the above charges for each month shall be rendered on or about the tenth day of the following month, and shall be paid within fifteen days after date of rendering.

6. *Power Factor:* It is contemplated that the Power Factor of the load of the Consumer shall not be less than seventy-five per cent, and all reasonable effort shall be made by the Consumer to maintain such power factor.

The Consumer shall so maintain its system of transmission and distribution that there shall be not more than ten per cent differ-

ence in current values between any two phases on the supply circuits.

7. *Suspension of Service:* If, at any time during the term of this agreement, by reason of strikes, accidents, fire, act of God, action of the elements, or by reason of any cause or condition beyond the control of either party affecting its plants, lines, equipment or sources of fuel supply, or by reason of any act of the civil legal or military authorities [*238*] the Power Company partially or wholly is unable to deliver, and the Consumer unable to receive the energy herein referred to, the obligation to deliver and/or receive such energy shall be suspended to the extent of the interruption; but the respective obligations of the parties shall revive and become operative as soon as the cause of the interruption is removed and the effects thereof remedied.

In case of any failure of the Power Company lasting for more than ten consecutive minutes, and due to reasons other than those above mentioned, to deliver the energy herein agreed upon or any part thereof, the Power Company shall compensate the Consumer for such failure by a pro rata reduction in the demand charge for the month in which such failure occurs, said reduction being such portion of said demand charge as the duration of the interruption bears to the total number of hours in the month in which it occurs.

The Power Company shall exercise all reasonable care and diligence to prevent interruptions from any causes, and to restore service after all interruptions, but the Power Company does not guarantee uninterrupted service nor shall it be liable to the Consumer or otherwise for any loss, cost or damage resulting directly or indirectly from interruptions to service.

8. *Maintenance of Equipment:* The parties hereto agree to maintain their respective lines and equipment necessary to carry out the provisions of this contract in such condition as to properly render the service hereby contracted for.

9. *Arbitration:* In case any dispute arises as to the interpretation of this agreement or any portion thereof, or as to the adjust-

ment of any claim or settlement in connection therewith, the question shall be submitted to arbitration. In such case the party aggrieved or moving in the matter shall give to the other party written notice of its desire to have an arbitration in which it shall state generally its grievance or the question to be decided and name an arbitrator. The other party thereupon [239] shall name an arbitrator within thirty days after receipt of said notice and in case of failure to do so the moving party shall appoint a second arbitrator. The two then appointed (in either manner) shall select a third and the Board of Arbitrators thus constituted shall thereupon proceed and determine the matter in dispute and the decision of any two of the arbitrators (including the disposition of the cost of arbitration) shall be final and conclusive upon the parties as to all questions of fact involved in such arbitration.

10. *General Provisions:* This agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

IN WITNESS WHEREOF The Connecticut Light & Power Company and The Borough of Groton have caused their respective corporate seals to be hereto affixed and this contract to be signed in their names and behalf, by their respective officers hereunto duly authorized the day and year first above written.

THE CONNECTICUT LIGHT & POWER COMPANY
Eastern Division.

Witness: By R. W. Perkins, Vice-President.
A. V. S. Lindsley
H. D. Larrabee

THE BOROUGH OF GROTON

By James A. Ward
James P. Gillogly
Charles E. White
Board of Water Commissioners
of the Borough of Groton

A. N. Tiffany, Jr.
A. N. Tiffany, Jr.

[*240*] THIS AGREEMENT made this 5th day of June, 1935, by and between The Connecticut Light and Power Company and The Borough of Groton, acting by and through its Board of Utility Commissioners (formerly Board of Water Commissioners)—

WITNESSETH:

That for good and valuable considerations, it is mutually agreed between the parties hereto—

That the fourth paragraph of Section 5 of the agreement of March 31st, 1930, between the same parties which provides

> "The Demand Charge shall be based upon a demand of not less than 75% of the maximum of any of the preceding eleven months, but in no case shall it be taken at less than 500 KW. The Demand shall be taken as the sum of the monthly demand readings at the individual substations"

is hereby stricken out, and that there be hereby substituted therefor the following:

> "The Demand Charge for any month shall be based upon the demand of that month provided, however, that it shall not be less than 80% of the maximum of any of the preceding eleven months, excluding the months of July, August and September nor less than 500 KW. The Demand shall be taken as the sum of the monthly demand readings at each delivery point."

That all other terms and conditions of said agreement of March 31st, 1930, remain unchanged, and

That said substituted fourth paragraph of Section 5 shall become effective with the billing for service rendered during the month of May, 1935, and shall continue in force as an integral part of said agreement of March 31st, 1930.

IN WITNESS WHEREOF The Connecticut Light and Power Company and The Borough of Groton have caused this agreement to be signed in [*241*] their names and behalf by their respec-

tive officers hereunto duly authorized the day and year first above written.

THE CONNECTICUT LIGHT & POWER COMPANY
Eastern Division

Witness: By R. W. Perkins, Vice-President.
Eleanor Keefe
H. D. Larrabee

THE BOROUGH OF GROTON
By J. A. Ward
Charles E. White
F. C. Sweet
Henry Gamber
Board of Utility Commissioners of the
Borough of Groton.

Witness:
A. N. Tiffany, Jr.
B. L. Colby

[*242*] MEMORANDUM OF AGREEMENT.

As provided in the existing power contract between The Borough of Groton and The Connecticut Light & Power Company, the Borough is exercising its right to purchase from the Power Company, the Groton Long Point substation equipment, and the land upon which it is located, at a mutually agreed price of $5363.28.

Under the existing power contract, the Borough is paying an investment charge at the rate of 11% per annum on a total investment of $30,210.12, which includes the above mentioned $5363.28 as the investment at Groton Long Point substation. The Borough shall continue to pay the full amount of the investment charge, but the Power Company shall apply against the agreed purchase price of $5363.28—11% of that sum per annum as bills are paid by the Borough until the full amount of $5363.28 has been thus liquidated. This shall be done monthly at the rate of $49.16 starting from November 15th, 1935.

The existing power contract remains in full force and effect to April 1st, 1940, and continues thereafter until terminated by one year's notice from either party to the other. Should this contract be cancelled on April 1st, 1940, or at any time prior to the complete liquidation of $5363.28 as above, then, from the date of such cancellation the Borough shall continue to pay to the Power Company the above $49.16 per month until the full amount is liquidated.

In consideration of deferred maintenance of the existing Groton Long Point substation, the Power Company will, at its own cost and expense, [243] erect, in substitution therefore, another substation structure, with suitable equipment of the same capacity and type of construction upon a different plot of land to be secured for the purpose by The Connecticut Light & Power Company at a location mutually satisfactory to the Borough and the Power Company.

The terms of this agreement shall apply to the substitute substation; and any additional cost for said different plot of land shall be treated as an addition to the before-mentioned agreed purchase price, of $5363.28 under the terms of this agreement.

Agreed to and accepted this 15th day of November, 1935.

THE CONNECTICUT LIGHT & POWER COMPANY
Eastern Division

Witness: By R. W. Perkins, Vice-President.
William B. Mitchell
M. Caryl

THE BOROUGH OF GROTON

By Henry Gamber
James A. Ward
Charles E. White
F. C. Sweet
Board of Utility Commissioners of the
Borough of Groton.

Witness: Borough of Groton.
Mary M. Dray
A. N. Tiffany, Jr.

[244] THIS AGREEMENT made this 15th day of June, 1935, by and between The Borough of Groton acting by and through its Board of Utility Commissioners, duly authorized thereto, hereinafter called The Power Company and The Fishers Island Farms, Incorporated under the laws of the State of New York (hereinafter called the Consumer) for themselves, their successors and assigns—

WITNESSETH:

That for and in consideration of One Dollar and other good and valuable considerations paid by each to the other, receipt of which is hereby acknowledged, the parties hereto do hereby agree each with the other as follows:

That the Power Company shall deliver to The Consumer and the Consumer shall receive and pay to the Power Company for electrical energy under the following terms and conditions:

1. Term: This agreement shall become effective June 15th '35 and shall remain in full force and effect until June 15th 1936, unless sooner terminated by consent of both parties hereto. After this agreement shall continue in full force and effect until terminated by either party upon six months' prior written notice to the other party. This agreement replaces agreement dated March 1st, 1929, between the Borough of Groton and the Fishers Island Farms, Inc., which agreement is cancelled by mutual consent.

2. *Lines and Equipment:* The Power Company shall deliver the electrical energy herein contemplated at its substation located at the Power Company's sub station at Groton Long Point in the Town of Groton and at such other points as may be mutually agreed upon.

The Power Company shall provide and maintain the lines, meters, transformers, switches and other sub station equipment

necessary [*245*] for said delivery and measuring of electrical energy.

3. *Delivery and Metering:* The delivery points shall be: the low tension terminals of transformers now installed, or of other transformers in substitution therefor, at the above mentioned substation of the Power Company at Groton Long Point in the Town of Groton: the end of its existing 6600 volt transmission line at Groton Long Point and such other points as may be mutually agreed upon.

Energy shall be metered at 6600 volts.

Energy shall be three phase sixty cycle at a nominal potential of 6600 volts, or such other voltage, at the metering point, as may be agreed upon. Except under abnormal conditions shall frequency vary more than one cycle above or below sixty cycles per second, nor shall potential vary beyond the limits of commercial feeder regulators, available at the date of this agreement.

All meters and equipment used for the purposes of this agreement shall be accessible at all reasonable times to both parties for inspection and reading; provided, however, that meter seals shall not be broken except in the presence of representatives of both parties unless the party not represented shall have consented thereto.

Watt hour meters shall be adjusted to register within the limits as prescribed by the New York Public Service Commission. Meters shall be regularly tested at periods not exceeding twelve months, but special tests may be made at any time upon request of either party provided that both parties are represented at such special tests. Tests which do not require meter seals to be broken may be made at any time by either party and the cost thereof shall be borne by the party making such test. The cost of all other tests both regular and special shall be borne by the Power Company except when on special tests the meter and equipment shall [*246*] be found to be more than two percent slow, the cost of the test in such case shall be borne by the Consumer.

4. *Service:* The Power Company agrees to deliver such energy as may be required by the Consumer at Groton Long Point up to 1000 KVA without notice at Groton Long Point. The amount of energy may be increased upon request of the Consumer after notice of sufficient length to allow the Power Company a reasonable time in which to provide the necessary new or additional equipment; provided that the Power Company shall be reimbursed by the Consumer for expenditures which, by request of the Consumer, it (the Power Company) may have been called upon to make within two years previous to any termination of this agreement.

5. *Price and Payment:* The service rendered and energy supplied under this agreement by the Power Company shall be charged to and paid by the Consumer as follows:

The total charges shall consist of a demand charge, plus an energy charge.

The Demand Charge shall be $1.75 per month per KW of 30 minute maximum demand.

The Demand Charge for any month shall be based upon the Demand of that month provided, however, that it shall not be less than 80% of the maximum of any of the preceding eleven months, excluding the months of July, August and September nor less than 125 KW. The Demand shall be taken as the sum of the monthly demand readings at each delivery point.

The Energy Charge shall be—

11 mills for each of the first 100,000 KWH taken in the month.
10 " " " " " next 100,000 " " " " "
9½ " " " KWH in excess of 200,000 KWH taken in the [247] month. The Energy Charge is based upon a cost of coal or equivalent fuel of $4.00 per gross ton, as unloaded from cars or barges at the steam power plant of the Connecticut Light and Power Company of Montville, Connecticut. The Energy Charge shall be increased at the rate of one mill per KWH per dollar, or fraction thereof, by which the actual cost of said fuel exceeds said $4.00, or fraction thereof, per gross ton.

The minimum bill in any month shall be the minimum demand charge.

Meters shall be read on the fifteenth day of each month and bills covering the above charges for each month shall be rendered on or about the fifteenth day of each month, and shall be paid within twenty days after date of rendering.

6. *Power Factor:* It is contemplated that the Power Factor of the load of the Consumer shall not be less than seventy-five per-cent, and all reasonable effort shall be made by the Consumer to maintain such power factor.

The Consumer shall so maintain its system of transmission and distribution that there shall be not more than ten percent difference in current values between any two phases on the supply circuits.

7. *Suspension of Service:* If, at any time during the term of this agreement, by reason of strikes, accidents, fire, act of God, action of the elements, or by reason of any cause or condition beyond the control of either party affecting its plants, lines, equipment or sources of fuel supply, or by reason of any act of the civil legal or military authorities the Power Company partially or wholly is unable to deliver, and the Consumer unable to receive the energy herein referred to, the obligation to deliver and/or receive such energy shall be suspended to the extent of the in- [*248*] terruption; but the respective obligations of the parties shall revive and become operative as soon as the cause of the interruption is removed and the effects thereof remedied.

The Power Company shall exercise all reasonable care and diligence to prevent interruptions from any causes, and to restore service after all interruptions, but the Power Company does not guarantee uninterrupted service nor shall it be liable to the Consumer or otherwise for any loss, cost or damage resulting directly or indirectly from interruption to service.

8. *Maintenance of Equipment:* The parties hereto agree to maintain their respective lines and equipment necessary to carry

out the provisions of this contract in such condition as to properly render the service hereby contracted for.

9. *Arbitration:* In case any dispute arises as to the interpretation of this agreement or any portion thereof, or as to the adjustment of any claim or settlement in connection therewith, the question shall be submitted to arbitration. In such case the party aggrieved or moving in the matter shall give to the other party written notice of its desire to have an arbitration in which it shall state generally its grievance or the question to be decided and name an arbitrator. The other party thereupon shall name an arbitrator within thirty days after receipt of said notice and in case of failure to do so the moving party shall appoint a second arbitrator. The two then appointed (in either manner) shall select a third and the Board of Arbitrators thus constituted shall thereupon proceed and determine the matter in dispute and the decision of any two of the arbitrators (including the disposition of the cost of arbitration) shall be final and conclusive upon the parties as to all questions of fact involved in such arbitration.

[249] 10. *General Provisions:* This agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

IN WITNESS WHEREOF the Borough of Groton and the Fishers Island Farms, Inc. have caused their respective corporate seals to be hereto affixed and this contract to be signed in their names and behalf, by their respective officers hereunto duly authorized the day and year first above written.

THE BOROUGH OF GROTON UTILITY COMMISSIONERS

By J. A. Ward
Charles E. White
F. C. Sweet
Henry Gamber

Witness
B. L. Colby
A. N. Tiffany, Jr.

THE FISHERS ISLAND FARMS, INC.
By Henry L. Ferguson, Pres.
R. C. Franklin, Asst. Treas.

Florence Boush
Helen E. Best

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* * * * * * [252]

THE CONNECTICUT LIGHT & POWER CO.
250 Freight Street

Waterbury Connecticut September 27, 1939

Board of Utility Commissioners of the Borough of Groton Groton Connecticut

Gentlemen:

Pursuant to the agreements of March 31, 1930 and June 5, 1935 between the Borough of Groton and The Connecticut Light and Power Company, we hereby serve notice in accordance with the terms of the agreement of March 31, 1930 of our desire to cancel both of said contracts, effective September 29, 1940.

Yours very truly,

A. V. S. LINDSLEY
Vice President

AVSL/ek

Acknowledged 9-29-39

No. 5 [253]

THE CONNECTICUT LIGHT & POWER CO.
250 Freight Street
A. V. S. Lindsley Vice President

Waterbury Connecticut June 14, 1940

Mr. A. N. Tiffany, Superintendent Water and Electric Department
Groton, Connecticut

Dear Mr. Tiffany:

This will confirm the conversation which I had with you and Mr. Henry Gamber, Treasurer of the Board, relative to a contract for the supply of electric power to the Borough, to replace the

contract expiring September 29, 1940. When the Borough is in a position to contract for a supply of electric power for resale and ultimate use entirely within the chartered territory of the Borough of Groton, we will be glad to enter into a new agreement to furnish the electrical requirements of the Borough under the conditions which we discussed and considered mutually agreeable on June 11, 1940. They are substantially as follows:

Delivery and Metering Point

Service to be delivered and metered at the 33,000 volt terminals of the company's transmission line at the Borough's Trails Corners substation. The Borough to furnish and maintain all receiving transforming, protective, regulating and distributing facilities required to receive and utilize the service.

Rate

The rate to be the sum of the following transmission, demand and energy charges—

Transmission line charge—$350 per month

Demand charge—$1.75 per kilowatt per month

Energy charge—6 mills per kilowatthour, subject to coal adjustment of seven ten-thousandths of a cent ($.0007) per kilowatthour for each one cent increase above $5.25 or decrease below $4.75 per net ton.

Determination of Demand

The demand billed to be the highest average fifteen-minute load in kilowatts (adjusted for power factor) in each month, but not less than the highest billing demand of the preceding eleven months. The power factor to be maintained by the Borough as nearly [*254*] as possible at not less than 90% lagging. Billing demand to be increased one percent for each one percent the power factor is less than 80% lagging, during periods of load exceeding 50% of the demand of the month.

Protective Clause

In consideration of the uncertainty of future costs, the Company shall have the right to revise the rate from time to time. If such revision results in a lower price it shall become effective upon notification to the Borough. If such revision results in a higher price it shall become effective sixty days after written notice is given of the Company's intention to make such revision, provided, however, that in such event the Borough shall have the right to cancel the agreement.

The other terms and conditions will be the usual and so-called standard clauses concerning payment, meter accuracy, etc., common to most contracts, and I presume substantially like those contained in the contract expiring September 29, 1940.

Such an agreement would contemplate that the Borough furnish the necessary substation equipment, transformers and distributing facilities, some of which now in use are owned by this company. If the Borough should desire to take over any or a part of the Company's equipment beyond the delivery and metering point specified, we will be very glad to make you an attractive offer on this equipment.

About a year ago we made, at your request, plans for a new substation structure for you at Trails Corners and estimates, which included the use of some steel structures which we had available from another substation. That equipment has now been used for other purposes.

If you desire, our engineers will be glad to go over the matter again with you and recommend plans and make estimates for such substation equipment as you may desire.

Should you wish to take over the 3 three phase transformers at Trails Corners, totaling 2,000 kva capacity, we would be willing to let you have these for the depreciated price of $6,500.

Should you be able to use the high tension line from Trails Corners to Groton Long Point by cutting off the base of the poles

and lowering the line, we will be willing to sell you this line at the prevailing price for the copper conductors at that time.

Should you desire at this time to take over any of this equipment which we own, and upon which you are paying an investment charge, we will be glad to make such adjustments in the present price as would properly reflect the change in the ownership of the equipment.

Yours very truly,

A. V. S. LINDSLEY

AVSL/ek Vice President

[*255*] [SEAL of Borough of Groton]

BOROUGH OF GROTON CONNECTICUT

Water and Electric Department
A. N. Tiffany, Superintendent

December 15, 1939

Mr. Henry L. Ferguson Fishers Island Farms, Inc. Fishers Island, New York

Dear Mr. Ferguson:

We are enclosing copy of a letter received from the Connecticut Light & Power Company; we believe the contents are self-explanatory.

We have since conferred with officials of the Connecticut Light & Power Company to obtain reasons why our contract cannot be continued or another written; they maintain that in these particular uncertain times they do not see their way clear to enter upon long term agreements.

Our Board of Utility Commissioners, of course, must abide by their decisions and it was made plain to us that to continue contracts similar to our present one would not be fair to all concerned.

The present contract of the Connecticut Light & Power Company with us will remain in force until September 29, 1940 but during the time ensuing it is believed that another type of contract may be promulgated for our future requirements; this contract, we

are led to believe, will not differ materially from the one we now have.

We also are led to believe that another contract will be of the type which will be protective to all concerned and will depend, to a marked degree, on labor costs, value of currency and/or other unforeseen factors.

We find it will be necessary for us to cancel our contract with the Fishers Island Farms, Inc., due to the above mentioned reasons, on September 20, 1940. We shall continue to supply service to you after said date on the same basis as we are able to obtain power from the Connecticut Light & Power Company.

[256] The Connecticut Light & Power Company has also advised us that ample time will be given (probably 90 days) before any rate changes are in effect after September 29, 1940.

If we have not made ourselves clear in this matter, we would be pleased to discuss it with you further at your convenience.

We have greatly appreciated the business given to us by you and shall do all in our efforts to continue the very pleasant relations we have had in the past.

Respectfully yours,

BOARD OF UTILITY COMMISSIONERS
by A. N. Tiffany—Supt.
Borough of Groton Utilities.

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[257] FISHERS ISLAND FARMS, INC.

Fishers Island, N. Y. December 16th, 1939

Mr. A. N. Tiffany, Superintendent, Borough of Groton Utilities, Groton, Conn.

Dear Mr. Tiffany:

I wish to thank you for your letter of December 15th with notice that our present contract with you will terminate on September 20th, 1940. I understand also that a new form of contract will be entered into between the Connecticut Light & Power Co. and the Borough of Groton.

I hope that you will bear in mind that the cost of electricity to us is high at the present time and in order for us to continue supplying electricity to the residents of Fishers Island we can not have the rates any higher. As a matter of fact I was about to write you to see if you could not reduce the rates in some way as we are continually receiving complaints on account of the electric charges.

Very truly yours,

FISHERS ISLAND FARMS, INC.

HLF—JGM H. L. Ferguson, Pres.

[*258*] [SEAL of Borough of Groton]

BOROUGH OF GROTON CONNECTICUT

Water and Electric Department
A. N. Tiffany, Superintendent

June 4, 1940

Mr. H. L. Ferguson, President Fishers Island Farms, Inc. Fishers Island, New York

Dear Mr. Ferguson:

In further reference to our letter of December 15, 1939 regarding cancellation of power contract with you, and also bearing in mind your acknowledgment dated the following day, we further wish to advise that due to the fact that our penalty incurred for selling interstate power (this being without charter provision) is that the Connecticut Light and Power Company will not enter upon any kind of agreement with our Department for power purchase, as long as we are interstate connected, the following vote was taken by the Board of Utility Commissioners at their regular meeting of May 29, 1940:

"Voted: That the Superintendent be instructed to notify Fishers Island Farms, Incorporated, that because of charter limitations it has become impossible for the Borough of Groton to renew its contract with the Connecticut Light and Power Company while the

Borough is supplying current to Fishers Island Farms, Incorporated."

Due to the afore-mentioned conditions, the Borough of Groton wishes to advise you that you must be prepared to obtain other means of power supply before June 15th, 1941.

We wish to assure you, at this time, that business relations with your corporation have been very satisfactory, and that it is with regret that we request you to sever connection from our service.

Very truly yours,

BOROUGH OF GROTON UTILITIES

A. N. Tiffany, Superintendent.

[*259*] FISHERS ISLAND FARMS, INC.

Fishers Island, N. Y. June 6th, 1940

Mr. A. N. Tiffany, Supt., Borough of Groton Utilities, Groton, Conn.

Dear Mr. Tiffany:

This is to acknowledge receipt of your letter of June 4th. We note that your company advises that we will be unable to secure power from you after June 15th, 1941.

Very truly yours,

FISHERS ISLAND FARMS, INC.

HLF—JGM H. L. Ferguson, Pres.

[*260*] [SEAL of Borough of Groton]

BOROUGH OF GROTON CONNECTICUT

Water and Electric Department

A. N. Tiffany, Superintendent

October 17, 1940

Mr. Leon M. Fuquay, Secretary Federal Power Commission Washington, D. C.

Dear Sir:

We are inclosing the correspondence and contracts as requested in your letter of October 12, 1940, and we respectfully request that

after you have procured the necessary information, the original contracts and correspondence be returned to us.

Some of the items are not at present available, and I believe that if the information which we are forwarding is not sufficiently detailed, we shall have to continue by correspondence. A considerable part of the negotiations have been verbal by representatives of The Connecticut Light and Power Company and the Borough of Groton Water and Electric Department, through its Treasurer, Mr. Henry Gamber, and Commissioner James A. Ward and its Superintendent, and, of course, we have no written records of these discussions.

In 1919 a ten-year contract was entered upon by the Borough of Groton Water and Electric Department and The Eastern Connecticut Power Company (now known as The Connecticut Light and Power Company) on a flat rate based upon a kilowatthour charge, plus the additional coal adjustment charge and percentage charge.

During negotiations of the renewal of the aforementioned contract in 1930 (copy inclosed), we were led to believe that provided our purchases were five million kilowatthours per year, we would be entitled to a purchase rate revision.

In the latter part of 1938, this Department started corresponding in an effort to obtain information regarding revision of rate which would become effective at the time of expiration of the 1930 contract, but to date we have been unable to conclude any new contract. In fact, at this writing we are purchasing electric energy without contract.

[*261*] We have been advised that due to the fact that we are selling power to Fishers Island Farms, Incorporated, State of New York, that no contract will be negotiated until we discontinue furnishing power to the Fishers Island corporation.

The Fishers Island Farms, Incorporated are now preparing to supply their own power as of June 15, 1941.

We are at present endeavoring to negotiate a contract for power required by the National Defense Act, specifically the

Electric Boat Company, Groton, Connecticut, and there appear to be other Defense Activities in this vicinity, which in all probability will require electric energy from our Department, but due to the fact that we have no purchase contract we are unable to quote a resale rate on contract.

It is the desire of this municipal corporation to supply energy to customers within our chartered territorial rights, and we earnestly hope that we may obtain some definite contract so that we may be able to submit to these prospective customers a definite purchase rate.

Respectfully yours,

BOROUGH OF GROTON UTILITIES

A. N. Tiffany Superintendent.

Vol. II

TRANSCRIPT OF RECORD

(Pages 117 to 637)

Supreme Court of the United States

OCTOBER TERM, 1944

No. 189

THE CONNECTICUT LIGHT AND POWER COMPANY, PETITIONER,

vs.

FEDERAL POWER COMMISSION

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

PETITION FOR CERTIORARI FILED JUNE 23, 1944.

CERTIORARI GRANTED OCTOBER 9, 1944.

APPENDIX TO BRIEF FOR PETITIONER.

VOLUME II, pages 117 to 637.

IN THE

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

No. 8341.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

ON PETITION TO REVIEW ORDER OF FEDERAL POWER COMMISSION ENTERED MAY 15, 1942.

CLAUDE R. BRANCH,
CARTER LEE,
CHOATE, HALL & STEWART,
30 State Street, Boston, Mass.,
DAY, BERRY & HOWARD,
750 Main Street, Hartford, Conn.
Attorneys for Petitioner.

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Attorneys for Petitioner.

L. H. LANE COMPANY, LAW PRINTERS, 221 HIGH STREET, BOSTON, MASS.

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PROCEEDINGS

HARTFORD, CONN., July 7, 1941.

* * * * * * [299]

Mr. Branch: The following enter special appearances for the respondent for the sole purpose of asserting lack of jurisdiction in the Commission over the respondent or over the subject matter of the above cited order of January 7th, 1941,—

Mr. Lawrence A. Howard and Mr. Olcott D. Smith, of the firm of Day, Berry & Howard, 750 Main Street, Hartford, Conn.

Claude R. Branch and Thomas J. Davis, Jr., of the firm of Choate, Hall & Stewart, 30 State Street, Boston, Mass.

Mr. Wahrenbrock: For the Commission, Howard E. Wahrenbrock and Howell Purdue, Commission Counsel.

Trial Examiner: The appearances will be entered.

* * * * * * [300]

Trial Examiner: Does coun el base their desire to enter a special appearance upon any question of the service of papers in connection with this hearing?

Mr. Branch: No, sir.

Trial Examiner: I understand your objection then is based on the general grounds of the jurisdiction of the Commission over your Company as a Public Utility; is that the reason for your special appearance?

Mr. Branch: Yes, sir; and over the subject matter of this litigation. No question is made as to the propriety of the service of papers. We had notice and know all about it.

* * * * * * [307]

Mr. Branch: May it please your Honor, we are ready. I think we discussed with you at our conference in Washington the order of procedure, and I am not complaining, that we haven't understood your position or the position of the Commission. Our position is that Counsel for the Commission should have the burden of proof and should proceed. My recollection is that

that matter was taken up with you, and you indicated that your ruling would be against us on that.

[*308*] Trial Examiner: That is correct. The burden is on the respondent to proceed.

Mr. Branch: May I have an exception noted to that?

Trial Examiner: You may.

* * * * * *

Mr. Branch: The contention of the respondent is that it is not a public utility within the mention of Parts 2 and 3 of the act, and it seems to us that that is the main issue in the proceeding before you. The reasons for that I will not go into. I think it is hardly useful at this time to argue the case. When and if we are forced to proceed, as I understand we are, we shall give merely a brief description, or [*309*] rather negative certain things that we feel are sufficient to show we are not subject to the jurisdiction of the Commission as such a public utility. The order to show cause alleges various failures on the part of the respondent to comply with orders and requests of the Commission. We have in our answer specifically made answer to those various allegations, giving our reasons for our failure to do so in cases where we have failed, and for the most part there is no dispute in regard to the fact that we have not done the major things that are requested, the things being matters which we contend can be required only of public utilities as defined in the parts of the Act to which I have referred. There are a number of other matters which conceivably counsel for the Commission might contend might be required, even of companies which were not public utilities. These matters seem to us to be trivial. They relate to such matters as failure to have an officer of the Company execute a supplemental oath, or something of that kind. Our answer also offers, in order to simplify the issue and save time, to do most of those things, and we hope that our statement that we are now willing to conform with those formalities in those instances will obviate the necessity for further inquiry into those matters, and that we will be able to confine ourselves to the real issue in this

case, that is, whether the respondent is a public utility within the meaning of the Act.

* * * * * * [*318*]

C. L. CAMPBELL

a witness called on behalf of Respondent, being first duly sworn, testified as follows:

Direct Examination by Mr. BRANCH.

Mr. Branch: May I ask whether it is customary in hearings before you, that counsel stand while examining witnesses or not?

Trial Examiner: It is not necessary that counsel stand while examining a witness, but they should rise in all cases in argument.

[*319*] Mr. Branch: Would it be just as agreeable to you if we sit, as to stand?

Trial Examiner: In questioning the witness, yes.

By Mr. Branch: *Q* Please state your name. *A* My name is C. L. Campbell.

Q Are you president of The Connecticut Light and Power Company? *A* I am.

Q How long have you held that position? *A* Since 1937.

Q Were you an officer of that company prior to that time? *A* Yes.

Q What position did you hold beginning with the year 1935? *A* I was vice-president in 1935 until I became president in 1937.

Q Will you describe in a general way the business of your company as it has been since August, 1935? *A*. The business of the company consists principally of the production, purchase, transmission, distribution and sale of electricity and gas for residential, commercial, industrial and municipal purposes in the State of Connecticut. The territory served by the company with electricity or gas or both covers approximately 3235 square miles, with a [*320*] population of about 703,000 based on the 1940 Federal Census, not including the territory served by other Connecticut utilities, purchasing substantially all of their requirements from the company. Electric service is supplied by the company in 107

towns, cities or boroughs of Connecticut, with a total population of about 660,000 based on the 1940 census, not including about 130,000 served by other Connecticut public utilities purchasing substantially all of their electric requirements from the company. The territory served directly by the company covers a substantial part of the State of Connecticut, including the cities of Bristol, Meridan, New Britain, Norwalk, Waterbury, Willimantic, Winsted, Putnam, Rockville, and the town of Greenwich. Electric energy is supplied at wholesale to other public utilities.

Q Are you familiar with the extent of the property and the scope of the business of your company? *A* Yes.

Q Does your company own any property or operate any property outside of the State of Connecticut? *A* No.

Q At any time since August 26, 1935, has it owned or operated any property outside of the State of Connecticut? *A* No.

[*321*] *Q* Has your company since August 26, 1935, bought or sold any electric energy outside of the State of Connecticut? *A* No.

Q Has your company at any time since August 26, 1935, owned or operated any interstate transmission line? A No.

Mr. Wahrenbrock: Mr. Examiner, I object to that last question. The examination is proceeding so rapidly, that I am afraid I did not get on my feet in time—

Mr. Branch: (Interrupting) I certainly do not want to take any advantage of that.

Mr. Wahrenbrock: It obviously calls for a legal conclusion that I believe the witness has not been qualified to express an opinion on.

Mr. Branch: It seems to me that that is a proper question, whether it has any interstate transmission line.

Trial Examiner: How was that question worded? As to the ownership of an interstate transmission line?

Mr. Branch: Ownership or operation of an interstate transmission line.

Trial Examiner: Does counsel mean by that a line—the owner-

ship of the line which crosses the State line? Is that what you mean?

Mr. Branch: Yes, sir.

Trial Examiner: I think if you will word your question [*322*] that way that it will avoid the conclusion that it suggested. An interstate transmission line may have two connotations. As I understood it, you meant a transmission line which crossed the State line?

Mr. Branch: Yes, sir. I will word it that way.

By Mr. Branch: *Q* Mr. Campbell, with that explanation, will you answer the question. *A* No.

Mr. Wahrenbrock: Now, Mr. Examiner, may I have the same ruling with respect to the preceding question which involved the question of the purchase or sale of electric energy outside of the State? That involves a question, both as to the legal question as to where the sale is, and involves the same electrical questions as to where the service which is being bought or sold is, neither of which the witness has been qualified to answer. I would like then to object to the asking of that question and ask that the answer already given be stricken.

Trial Examiner: Have you made a motion to strike?

Mr. Wahrenbrock. Please.

Mr. Branch: It seems to me that the question is perfectly clear and proper and is not subject to the objections which have been stated, whether they bought or sold any electric energy outside of the State of Connecticut.

[*323*] Trial Examiner: In other words, I understood the question to mean, and I think you meant the question in the sense of whether any sales were made outside of the State, that is, whether any contracts were made outside of the State,—is that the idea?

Mr. Branch: Contracts with parties outside of the State, yes.

Trial Examiner: In view of that statement, do you still have the same objection?

Mr. Wahrenbrock: If the question and the answer thereto may

be stricken and that question put, I have no objection to its being answered.

Mr. Branch: I am sorry, I did not hear that. I was interrupted.

Trial Examiner: Counsel for the Commission made the statement that if the original question were withdrawn and the question asked in the manner which you have last stated—contracts with parties outside of the State, that he would have no objection to the question in that form.

Mr. Branch: Very well, I will ask that question of Mr. Campbell.

Mr. Wahrenbrock: And may the answer to the preceding question be stricken?

Trial Examiner: I will so direct.

The Witness: The answer is, no.

[324] By Mr. Branch: *Q* And in that connection, Mr. Campbell, did your company at any time since August 26, 1935, make any contracts to deliver electricity or to receive electricity outside of the State of Connecticut? *A* No.

Mr. Wahrenbrock: Mr. Examiner, before that answer is received, may I have the same objection and have it specified what "outside of the State" in the language it refers to?

Trial Examiner: I think the question might be clarified to that extent.

By Mr. Branch: *Q* Did your company, Mr. Campbell, at any time since August 26, 1935, sell any electricity to anyone to be delivered outside of the State of Connecticut?

Mr. Wahrenbrock: Just a moment, please. I am going to have to object to that question, Mr. Examiner—the "to be delivered".

Trial Examiner: Do you make that to be delivered to the immediate purchaser outside of the State?

Mr. Branch: Yes, sir.

Mr. Wahrenbrock: By the terms of the contract? If that is the meaning of the question, I have no objection.

Mr. Branch: Yes, that is my meaning.

The Witness: The answer is, no.

[325] By Mr. Branch: *Q* Did your company enter into any arrangement or contract by which it was to receive outside of the State any electricity?

Mr. Wahrenbrock: May I object to that question unless it is specified—

Trial Examiner: (Interrupting) I think that the question, in view of the wording—counsel used the expression "received outside of the State" any electricity, and I think in view of that question, that your objection will not stand to that question. I will overrule your objection to that question.

Mr. Wahrenbrock: On that point, I believe the witness would have to be qualified to state where the service which is being received is located, and in the case of electric energy which is generated in one State and consumed in another State, which might be questions of a technical nature, which he has thus far not been qualified to answer. And if the question is modified to make it "according to the terms of the contract", I have no objection to it.

Mr. Branch: I think that that question is proper, and I object to the motion to strike.

Trial Examiner: Will you re-state the question? I would like to have the question restated. Will you read it, Mr. Reporter?

(Whereupon the last question as above recorded, was read [326] by the reporter.)

Trial Examiner: The question is permissible. He may answer.

The Witness: The answer is, no.

By Mr. Branch: *Q* At any time since August 26, 1935, has your company owned any line connecting at the Connecticut State line with the line of any other utility? *A* No.

Q At any time since August 23, 1935, has any electric energy crossed the State line under the ownership or control of your company?

Mr. Wahrenbrock: Mr. Examiner, I must object to that question. The question of electric energy crossing the State line and under whose control it is, is one that calls for technical qualifica-

tions which have thus far not been shown with respect to this witness.

Trial Examiner: The objection is sustained so far as there is any qualification yet shown of this witness.

By Mr. Branch: *Q* I will ask the question whether at any time since August 26, 1935, any electric energy has crossed the State line under the ownership of your company?

Mr. Wahrenbrock: The same objection, for the same reasons.

Trial Examiner: Same ruling.

[*327*] Mr. Branch: Will your Honor note my exception?

Trial Examiner: Yes.

Mr. Branch: Also I understand that you sustained an objection to the previous question?

Trial Examiner: Yes.

Mr. Branch: I thought I had split it up into two questions, but I will now ask the question for the purpose of the record, you understand.

By Mr. Branch: *Q* At any time since August 26, 1935, has any electric energy crossed the State line under the control of your company?

Mr. Wahrenbrock: To that question I object for the reasons stated.

Trial Examiner: Objection sustained.

Mr. Branch: And may my exception be noted?

Trial Examiner: Yes.

By Mr. Branch: *Q* At any time since August 26, 1935, has your company sold any electric energy to any company or other utilities outside of Connecticut? *A* No.

Q At any time since August 26, 1935, has your company delivered any electric energy to any company or other utility at the State line?

Mr. Wahrenbrock: To that question I object as calling [*328*] for a statement as to the point of delivery of electric energy which requires a technical showing by a man technically qualified to

establish the point of delivery of electric energy, the qualifications not yet having been given with respect to this witness.

Mr. Branch: I do not think it calls for that. It calls for the arrangements which were made and what was done.

Mr. Wahrenbrock: If counsel wishes to phrase his question so that it will refer to what the contracts provide, or with respect to contract provisions, I will not make that objection.

Trial Examiner: Will you reword your question to make it a matter of contract provision?

Mr. Branch: I can do that very easily, sir, but I wish to press the question that I have asked and would like a ruling on it.

Trial Examiner: I will rule that the question is not in order as far as the present qualification shown by the witness as to the point of delivery. The contract provisions may be shown by this witness, however.

Mr. Branch: May I have an exception noted?

Trial Examiner: You may.

Mr. Branch: I will avail myself of the ruling—

Trial Examiner: (Interrupting) I may say in that connection that an exception should be noted automatically by the reporter in every case where an objection is overruled or where [*329*] an objection to a question is sustained.

Mr. Branch: Then I understand that it will be unnecessary for me to go through the rather unpleasant routine of taking an exception on the record after each unfavorable ruling?

Trial Examiner: That need not be done. The exception will be noted by the reporter.

Mr. Branch: I trust that your Honor will pardon me occasionally for making the statement that I take an exception, through force of habit.

Trial Examiner: That is natural.

By Mr. Branch: *Q* At any time since August 26, 1935, has your company had any contract or arrangements calling for delivery of electric energy to any company or other utility at the State line? *A* No.

Q Did any registered holding company own a majority of the voting stock of your company? *A* Yes.

Q Will you please explain—

Mr. Wahrenbrock: Mr. Examiner,—excuse me, I withdraw my objection.

The Witness: The United Gas Improvement Company owned —may I have the question again? I am a little bit confused as [330] to its wording.

By Mr. Branch: *Q* I think you have just said that your company did—or that a registered holding company did own a majority of the voting stock of your company. I am now asking you if you will explain that.

Trial Examiner: I do not believe he answered that question yet. I think he was interrupted.

The Witness: I was over in midstream with the question.

Mr. Wahrenbrock: To that question I interpose an objection that it is irrelevant to this proceeding.

Mr. Branch: I think we will take more time arguing that than we will to answer the two very short questions I have in regard to it.

Trial Examiner: I think we will admit it for what it may be worth.

Mr. Wahrenbrock: May I be heard, Mr. Examiner?

Trial Examiner: Yes.

Mr. Wahrenbrock: The only purpose that I can anticipate, and I am making an argument now without knowing what argument is made in support of the question, the only purpose I can anticipate is to show that the respondent was subject to the requirements of the Public Utility Holding Act of 1935, and I anticipate that the only relevancy that might be assumed that it would have is with reference to the amortization of the [331] unamortized debt, discount and expense on the security issue made by the respondent since August 26, 1935.

The Commission will judicially notice the Public Utility Holding Company Act, and will notice that there is no provision applic-

able to this company requiring or affording any means by which the Securities and Exchange Commission is authorized to pass upon that plan of amortization or any plan of amortization and that being the case, any proof that this company is subject to the Public Utility Holding Company Act is irrelevant.

Mr. Smith: Mr. Examiner, may I state this point?

Trial Examiner: Yes.

Mr. Smith: Mr. Wahrenbrock is correct. He has anticipated the reason for these questions. The relevancy I think is obvious, because we have a stipulation which will later be presented to your Honor, which Mr. Wahrenbrock has advised me he has signed, which stipulation covers two paragraphs put in at the request of Mr. Wahrenbrock or myself—I don't remember which—concerning this very matter of the applicability to this company of a provision of the Public Utility Holding Act of 1935. There is a provision in the Federal Power Act, Section 318 which provides, we claim, that if a company is subject to the regulatory authority under the Public Utility Holding Company Act, then it is not subject to the regulatory authority under [*332*] the Federal Power Act. That is a question of construction. To lay the basis for that claim, we wish to show that we were subject to the Public Utility Holding Company Act of 1935, because we were a subsidiary of a registered holding company.

Trial Examiner: Is there anything further?

Mr. Wahrenbrock: Mr. Examiner, in response to that, I may say that Paragraph 3 of the stipulation which we will offer is included in the draft of the stipulation which I have signed and which the respondent's counsel has signed, and when that stipulation is offered, I shall object to the inclusion of that paragraph pursuant to the provision of the stipulation permitting me to make such objection, as being irrelevant and immaterial. If as a matter of fact and law, the respondent though a subsidiary of a registered holding company was not subject to any requirement, regulation or order of the Securities and Exchange Commission with respect to its plan of amortization of this debt discount and

expense, then it is not by the provisions of Section 318 exempt from the requirements of the regulations prescribed by the Federal Power Commission, so that the proffered evidence is irrelevant.

Trial Examiner: I doubt the relevancy and materiality of the evidence on this point. It may enter, however, into the question of motive.

Mr. Wahrenbrock: I beg your pardon?

[*333*] Trial Examiner: And the general attitude toward regulation by the Federal Government, and for that reason I will permit the witness to answer the question.

Mr. Wahrenbrock: May I specify this additional point, which is aside from the main point of my argument, and that is, that the matter is stipulated, and if admissible will be found in the stipulation, and anything now would be, which it need not be, the subject of cumulative evidence.

Trial Examiner: The ruling of the Trial Examiner is that the question may be answered.

By Mr. Branch: *Q* Mr. Campbell, have you the question in mind now? *A* Yes.

Q I just asked you whether any registered holding company did own a majority of the voting stock of your company? *A*. Yes.

Q I understand that a registered holding company did own a majority of the stock. *A* Yes.

Q Will you explain that situation. *A* The United Gas Improvement Company owned 701,253 shares until April, 1941. It owned these shares for many years, some prior to August 26, 1935. This constituted about 61 per cent of all of the common stock, which had been the only stock of the company which has had voting power.

[*334*] Mr. Wahrenbrock: I move that that answer and the question be stricken for the reasons I stated.

Trial Examiner: The motion is overruled.

Mr. Wahrenbrock: Exception.

By Mr. Branch: *Q* Has the United Gas Improvement Company sold all of its stock in your company? *A* Yes.

Mr. Wahrenbrock: I object to that for the same reason.

Trial Examiner: You may answer the question, if you know.

The Witness: Yes, it sold it in April, 1941.

By Mr. Branch: *Q* Were you aware in 1935, of the fact that legislation was pending in Congress which resulted in the passage of what is now Part 2 of the Federal Power Act? *A* Yes, I kept in touch with the progress of that legislation.

Q Prior to the enactment of that legislation, did you endeavor to arrange the conduct of the business of your company so that it would not be subject to the provisions of Part 2 of that Act? *A* Yes, I did.

Q Have you at all times since August 26, 1935, been of the opinion that your company was not a public utility, as that term is defined in Part 2 of the Federal Power Act? [*335*] *A* Yes.

Q Since you have been president, have you been the officer of your company who has formulated its policies in regard to its dealings with the Federal Power Commission? *A* Yes.

Q In those cases in which your company has not complied with orders of the Commission, what was the reason for non-compliance? *A* In general, the reason was that I believed that the requests were properly applicable only to public utilities, as that term is defined in Part 2 of the Federal Power Act, and I believe that the company was not such a public utility. We did, however, from time to time, furnish the Power Commission with information which it requested. In some cases it seemed doubtful whether the Power Commission was requesting information of us as a public utility within the meaning of Part 2 of the Federal Power Act, or whether it was endeavoring to secure information as provided in Section 311 of the Act. I believed it was doubtful if the Commission has the right to require us to prepare special data under the provisions of Section 311, and felt that all we could properly be required to do would be to furnish such information as we had. We consequently did furnish information

which we had in the form in which we had it, or told the Federal Power Commission where it could get such information.

* * * * * * * [378]

By Mr. Branch: *Q* Have you the answer now? *A* Yes.

Q I direct your attention to paragraph 12 on pages 5 and 6 in which it is alleged the company has filed with the Federal Power Commission, on certified Power Commission forms, various rate schedules, contracts, and statistics as to the production of energy, and I ask whether or not the files of your company indicate that such forms were filed with the Federal Power Commission? *A* Yes, they do.

Q There is, however, mention of certain specific things that you have filed, but there is one place at least where it [379] says your company has filed each additional contract between the company and every other utility. Was that a mistake, Mr. Campbell? *A* Yes. An investigation made under my direction shows that all of the things referred to in paragraph 12 of the answer were filed except our additional contracts with other utilities.

* * * * * * [387]

Cross Examination by Mr. WAHRENBROCK.

* * * * * * [405]

Q Referring to paragraph 12 of the respondent's answer to the order to show cause, and to the sub-paragraph of that item which begins, "In January, 1935, all of the then existing contracts of the company— *A* Just a moment.

Trial Examiner: That is the second paragraph on page 6 of the answer.

The Witness: Yes.

Q (Continuing) "All the then existing contracts of the company with other utilities on Federal Power Commission form No. 2." Were those contracts submitted in response to a request from the National Power Survey, which was being conducted by the Commission at that time, or the National Rate Survey? *A* I was just trying to think. I am not sure, but I think it was filed in connection with some regular form that the Commission had sent

out generally through the country as a whole, to the utility business, asking for this information. Whether it was in connection with the filing of an annual report, or whether it was a special question, and just what it had to do with, I don't know.

Q Those contracts were submitted in January, 1935, before the Federal Power Act had been enacted? *A* Yes.

Q Now, I believe you stated that the subsequent state- [*406*] ment which appears in the answer is incorrect. That statement reads, "Since that date it has filed each additional contract between the company and any other utility." *A* I don't understand that question.

Q Is that statement in the answer incorrect, which reads, "Since that date it has filed each additional contract between the company and any other utility"?

Trial Examiner: That is the remainder of that paragraph following right on there, the second paragraph, page 6.

The Witness: Yes, that is incorrect.

By Mr. Wahrenbrock: *Q* Now, will you tell me what contracts there has been between the company and other utilities for the sale of electric energy for resale since January, 1935? *A* I couldn't enumerate them. There may have been none, there may have been quite a number.

* * * * * * [*408*]

Q Have you made any contract or any modification of a contract with the Borough of Groton since 1935? *A* Yes.

Q Do you remember when that was? *A* I would say it was within a year.

Q That is the only change or modification in the contract with the Borough of Groton since the beginning of 1935? *A* I wouldn't want to say that. I don't know.

Q You think there may have been another one? *A* It is quite possible there may have been, but there may not have been. I don't know.

Q Did you have any contract covering the delivery or receipt of energy at wholesale at New Britain with The Connecticut Power Company? *A* No.

Q You have had at no time since the beginning of 1935? *A* No.

Q When you received energy at New Britain up to some time in August, 1935, under what arrangement was it received? *A* I don't know that I quite understand what you mean by arrangement.

Q You heard the question all right? [*409*] *A* Yes, but I don't understand what you mean by arrangement. Do you mean physical arrangement?

Q I mean under what contractural arrangement or agreement? *A* There was no agreement. The power and equipment was supplied from our main system, consisting of two steam plants, one at Montville, one at Devon, and several hydro-electric plants scattered throughout the State, tied together in a State-wide transmission system.

* * * * * * [*410*]

By Mr. Wahrenbrock: *Q* What contract was in effect covering those receipts and deliveries of electric energy between your company and the Connecticut Power Company at New Britain? *A* By New Britain do you mean the City of New Britain, or at a point near New Britain?

Q You did receive electric energy, delivery of electric energy from and to the Connecticut Power Company after January 1, 1935? *A* I expect we did.

Q And was that under an agreement or a contract with the Connecticut Power Company? *A* I am not sure it was with the Connecticut Power Company.

[*411*] *Q* With whom was it? *A* It may have been with the Connecticut Power Company, but it may have been that it was through—It was through a combination, as I recall it, of the Hartford Electric Light Company and the Connecticut Power Company, under which those systems were interconnected at a point—interconnected with our system at a point near New Britain, and power was interchanged with those companies. The contract was not a—well, I suppose it was a contract—it was an orally

expressed arrangement, mostly, which could be terminated at notice.

Q Did you file any copy of that contract with the Federal Power Commission at any time? *A* I don't expect so, no.

* * * * * * [*412*]

By Mr. Wahrenbrock: *Q* At any time since January 1, 1935, has the Connecticut Light and Power Company received electric energy from the Connecticut Power Company for its Bristol system? *A* Yes.

Q Is that received under and in accordance with the terms of a contract between them? *A* It is.

Q When was that contract made? *A* The original contract was made a very long time ago, before the Connecticut Light and Power Company had anything to do with the Bristol situation. The contract has been modified at least once, perhaps more than that, since we took over the Bristol Company, which was in 1926 or 1927, somewhere then. Just when the last revision was made, I am not able to tell you from my recollection.

Q Would it refresh your recollection for me to suggest there was a contract dated November 1, 1930? *A* Well, if that is—if there is a contract with that date, that must be it. If you show me the contract, I—

Q I show you a copy of the six-page document bearing in the upper right-hand corner of the first page the notation, "The Connecticut Power Company, rate schedule, FPC No. 4, effective date November 9, 1937, filing date November 9, 1937", [*413*] and ask you if you recognize that? *A* Yes, I would expect that that is the present effective contract between the two companies. It is the effective contract covering the supply of power.

* * * * * * [*414*]

Mr. Wahrenbrock: I hand the reporter and counsel for the other side copies of the contracts to which I have last referred and ask that the reporter mark it for identification as Exhibit 8.

Trial Examiner: They will be so marked.

(The document referred to is marked Exhibit Number 8 for Identification.)

[*415*] By Mr. Wahrenbrock: *Q* Is the contract of which Exhibit 8 for Identification purports to be a copy, filed with the Federal Power Commission with the stamp of the Federal Power Commission as the identification in the upper right-hand corner to which I have referred, a contract which is now in force and effect? *A* Yes, I understand that those two notations there are excluded as a part of the contract?

Q Yes. *A* Yes, it is.

Q Has it been modified at any time? *A* I think not, no, not as far as I recall.

Q No copy of this contract was ever filed by the Connecticut Light and Power Company with the Federal Power Commission? *A* I don't know.

[*416*] *Q* You have no recollection that any copy of this ever was filed? *A* No.

Q Was the contract therein referred to in the second paragraph as an agreement dated as of November 1, 1930, ever filed with the Commission? *A* I don't think so.

Trial Examiner: I think you had better make your question "filed by" some person, since there is evidence that it was filed by somebody.

By Mr. Wahrenbrock: *Q* I intended, and I think you understood my last question to mean "by the Connecticut Light and Power Company"? *A* I so assumed.

Trial Examiner: I thought both of you gentlemen assumed that but the record did not so show.

Mr. Wahrenbrock: Thank you very much, Mr. Examiner.

Now I hand counsel for the respondent and the Examiner and the Reporter a one-page document for identification as Exhibit 9.

Trial Examiner: It will be marked Exhibit 9 for Identification.

(The document referred to was marked Exhibit No. 9 for Identification.)

By Mr. Wahrenbrock: [*417*] *Q* I show the witness Exhibit 9 for Identification and ask him whether that indicates that the contract, of which Exhibit 8 is a copy, was modified. *A* I should say Yes.

Q Do you recognize that exhibit number 9, Mr. Campbell? *A* What do you mean by "recognize it"?

Q Are you familiar with the original, of which that is a copy? Do you recognize that? *A* No, I do not.

Q Do you have any knowledge of the letter of which that purports to be a copy? *A* Only the copy.

Q In the light of the statements made in that copy, have you now any recollection of whether the agreement of which Exhibit 8 is a copy was, as a matter of fact, modified? *A* I should say it had been.

Q Do you have any recollection of that independent of Exhibit 9? *A* No.

Mr. Wahrenbrock: I hand respondent's counsel and the reporter and the Examiner a one-page document which I ask to have identified as Exhibit 10.

Trial Examiner: It will be so marked.

Mr. Branch: 10 for Identification?

[*418*] Trial Examiner: 10 for Identification.

(The document referred to was marked Exhibit Number 10 for Identification.)

By Mr. Wahrenbrock. *Q* Mr. Examiner, I hand the reporter's copy of Exhibit 10 to the witness, and I ask you, Mr. Campbell, if you have any recollection of the transaction referred to in that exhibit? *A* No. That appears to be an acceptance of the previous letter, the other exhibit.

Q Does that refresh your recollection with respect to the modification of the contract of which Exhibit 8 is a copy? *A* Not very vividly. I recall now that I read that correspondence that there were certain discussions with the Connecticut Power Company, and in which I did not take part, which evidently led to this

adjustment or modification of that contract which you have previously referred to.

Q Was that modification or any copy of it filed by the Connecticut Light and Power Company with the Federal Power Commission? *A* I don't think so. If it was, they have a copy of it.

Q You do not recall that it was filed? *A* No.

[*419*] *Q* I am not sure whether I asked you whether the agreement of November 1st, 1930 referred to in Exhibit 8 was ever filed by the Connecticut Light and Power Company with the Federal Power Commission? *A* I don't know whether you asked me or not. The answer is that I don't know.

Q You have no recollection that it was? *A* I have no recollection.

Q Since January 1, 1935, has the Connecticut Light and Power Company delivered electricity to the Torrington Electric Light Company? *A* I don't know that I can answer that question. I don't know that it is capable of being answered.

Q Why not? *A* It is rather a complicated matter. We are buying power, or were for much of that period in question from the Torrington Company, and we have a small hydro-electric plant at Robertsville which feeds into that system, and I would suppose that none of that power went into Torrington, but it may have.

Q You have a contract with the Torrington Electric Light Company, covering at least the purchase of electric energy from that company? *A* Yes, sir.

Q When was that contract entered into? [*420*] *A* I cannot tell you when it was entered into. I don't recall the date, but if you have a copy of the contract, it ought not to be difficult to determine it.

Q I do not have a copy of the contract.

Mr. Wahrenbrock: I would like to call upon the respondent if it will please make available for inspection a copy of that contract.

The Witness: I beg your pardon; I find a reference here to the date. I have some notes here that I did not see. • It was dated August 11th, 1930.

By Mr. Wahrenbrock: *Q* August 11th, 1930? *A* Yes.

Q And is that contract on that date still in full force and effect? *A* No.

Q Has it been modified? *A* It is terminated.

Q It has been terminated? *A* By mutual agreement.

Q When was it terminated? *A* Oh, two or three months ago.

Q Was a new agreement entered into? *A* Let me modify my last answer; I am not quite correct. That contract in question was first modified by a letter dated [*421*] December 31, 1932. That modification dealt solely with some of the terms of the contract. We have owned for a number of years a right-of-way upon which we could build a line to connect with the line running from Winsted, so that the supply to Winsted, which is where the power for Torrington is purchased for the use of, could be supplied from our own system, and we have considered many times building that line and taking over the supply. Early this year, a study indicated that we could save some money by doing so, and we agreed with the Torrington Electric Light Company that upon the completion of the facilities, the other facilities, the present contract would be terminated, notwithstanding the fact that its terms calls for several years to run.

Q What is the date of that agreement? *A* That oral agreement?

Q Whatever form it was in. *A* I cannot tell you exactly. It was within the last two or three months.

Q And it was an oral agreement? *A* Yes.

Q There is nothing in writing about it? *A* Yes. I think after the conversation it was confirmed by a letter.

Q What was the date of the confirmation letter? [*422*] *A* Well, two or three days after the conversation.

Q Aside from the modification of December 31, 1932, and the agreement for the future termination of the contract, were there any other modifications or changes of the 1930 contract with the Torrington Electric Light Company? *A* There was no change in the contract.

Q No change in the contract? *A* Yes.

Q What other change was there? *A* Well, there was a change in the situation with respect to the source of the power that would be supplied by Torrington to the Electric Light and Power Company. That arrangement was consummated, I should say, about the middle of June or the early part of June.

Q Of what year? *A* 1941.

Q Was that an oral change? *A* Yes.

Q What was that change? *A* That change was that our line would be running carrying a supply of power to Winsted, and would be disconnected from the facilities to which it had formerly been connected in Torrington and be connected directly to a steam generating plant of the Torrington Electric Light Company, and the supply of power would be furnished from that steam plant.

[*423*] *Q* Was there any change in the price to be paid for the energy? *A* No—I would like perhaps to clarify that answer a little bit, because I do not want to mislead you. There was no change in the price for the energy, but the understanding and the arrangement with the Torrington Company was that we would pay them the same price for the energy as had formerly been paid under the old contract, but that we would in addition thereto pay them for their out-of-pocket expense in operating the steam plant, less the amount that they would have been called upon to pay the Connecticut Power Company, from whom they obtained their supply of power, if they had not generated the power for us at Torrington.

Q Was that agreement confirmed? *A*. No, I don't know that it was.

Q It was wholly oral? *A* Yes. There may have been some letter passed on it.

Q Did you write any letter on it? *A* I did. I wrote a letter as to the price.

Q When was the letter written? *A* Oh, a week or ten days after the arrangement was consummated—within a week.

Q Still in June of 1941? *A* Yes, sir.

Q Who handled the negotiations for that on behalf of [*424*] the Connecticut Light & Power Company? *A* I did.

Q In the discussions with the Torrington Company, did anybody participate with you in those discussions? *A* On behalf of us?

Q Yes? *A* No.

Q Who spoke on behalf of the Torrington Company? *A* Mr. Frank M. Travis. He is the president of the Torrington Electric Light Company.

[*425*] *Q* Was the— *A* May I add to that, after the discussion, there were then some engineering details to work out, perfect. Mr. Travis called in his engineers, his operating people, and explained what he had agreed to do with me, and I sent for our operating people. They worked out the details of the physical arrangements to carry out this plan.

Q Now, was the contract of 1930 with the Torrington Electric Company ever filed with the Federal Power Commission by the Connecticut Light and Power Company? *A* I can't answer that question. I don't know.

Q So far as your knowledge goes, it never was? *A* So far as my recollection goes, it never was.

Q You have no recollection of its having been filed with the Federal Power Commission? *A* No.

Q Was the December 31, 1932 modification ever filed with the Federal Power Commission? *A* Not as I recall.

Q Was the change, made as you say, in early June of 1941, for the termination of the contract—was the letter of confirmation with respect to that agreement ever filed with the Federal Power Commission? *A* No.

Q Was your letter with respect to the payment to be made [*426*] by the Connecticut Light and Power Company, the change in the payment to be made, ever filed with the Federal Power Commission? *A* No.

* * * * * * [454]

Cross Examination by Mr. WAHRENBROCK.

Q Mr. Campbell, I am going to have handed to you the original contract between the respondent and the Torrington Company, and ask you if you can tell us what the duration of that contract was to be, according to terms?

Mr. Branch: What is the date of that, may I inquire? May we have the date of that contract given so that we can identify it?

The Witness: August 11, 1930. The contract was to continue in force until June 1, 1944, unless terminated by one year's written notice to the Torrington Company, as provided in the preceding paragraph.

* * * * * * [455]

By Mr. Wahrenbrock: *Q* I direct your attention to the letter of December 1, 1932, to which you referred in your testimony yesterday, and ask you if that is the agreement you referred to modifying in some particulars the contract to which you have previously referred? *A* Yes, sir.

Q That made no change in the effective period of the contract or the termination provision of the contract? *A* No.

Q I now direct your attention to the letters of March 19, 1941, from the respondent to the Torrington Company and the letter of March 21, 1941, from the Torrington Company to the respondent, and ask you if those letters provide for the termination of the contract prior to 1944? [456] *A* Yes, they do.

Q And do those provisions purport to comply with the one-year termination notice provision of the first contract? *A* Well, this was an agreement that we could terminate the contract earlier than a one-year's notice.

Q Yes. *A* And it was determined that the contract would terminate.

Q And those letters did terminate the contract? *A* Yes.

* * * * * *

Mr. Wahrenbrock: May the three letters to which I last referred, be handed to the reporter for copying and shown in the record as read?

Trial Examiner: Would there be any great difficulty for the witness to read them into the record?

[457] The Witness: Shall I proceed, sir?

Trial Examiner: Yes.

The Witness: Letter dated December 1, 1932, to the Torrington Electric Light Company, Torrington, Connecticut, attention of Mr. C. E. Smith, Treasurer.

"Dear Mr. Smith:

"Confirming our conversation of yesterday and your telephone conversation with Mr. Day of the same date, my understanding is as follows:

"Beginning with November 1, all surplus power supplied to your company will be billed at 5 mills. A meter will be installed at the earliest convenience which will measure any power which we might furnish over and above the Torrington load, and which would find its way into the lines of the Connecticut Power Company.

"In making up your bill for this surplus power, the number of kilowatt hours will be the kilowatt hours as reported by the billing meter at Torrington, less any kilowatt hours registered by the meter which is to be installed to show the power which might have been used which might find its way into the Connecticut Power Company's lines.

"For the month of November, the bill shall be for the kilowatt hours actually supplied to your system as shown by the meter, less an estimated amount of 1,000 k.w.h. which we supplied the Connecticut Power Company."

[458] "Very truly yours,

"A. C. BRISTOL, Manager."

Letter dated March 19, 1941, to the Torrington Electric Light Company, F. M. Travis, President, Torrington, Connecticut:

"Dear Sirs:

"Referring to the agreement dated August 11, 1930, we propose to make the connection between our own transmission system and the system of what was formerly the Winsted Gas Company, and upon the completion of that connection, will undertake to supply ourselves with power, and discontinue taking electric power under the agreement referred to.

"In accordance with Section 12 of the said agreement, we hereby give you written notice of this intention on our part so that the agreement can be properly terminated.

"I understand that in accordance with my recent conversation with Mr. F. M. Travis, your president, he agreed to waive the one-year's notice of termination called for by this Section 12, and that as soon as our own facilities have been erected and completed so that we are in a position to supply power to ourselves, any obligation to take power from you will cease and terminate.

"It is estimated that we will be able to install these facilities, and have them ready in about six months' time.

"Will you kindly acknowledge the receipt of this notice?

[459] "Yours very truly,

"C. L. CAMPBELL, President."

Letter dated March 21, 1941, to the Connecticut Light and Power Company, Hartford, Connecticut, attention of Mr. C. L. Campbell, President.

"Dear Sir:

"We acknowledge the receipt of your letter of March 19, 1941, giving notice that under Section 12 of the agreement dated August 11, 1930, you desire to terminate this agreement. This will take place as soon as you can supply yourselves with power, requiring an estimated period of six months.

"We understand the impossibility of an accurate construc-

tion-time estimate and will waive any unused part of the one-year's termination notice required by our contract.

"Yours very truly,

"THE TORRINGTON ELECTRIC LIGHT COMPANY,
"By, F. M. Travis, President."

* * * * * * [*461*]

By Mr. Wahrenbrock: *Q* Mr. Campbell, is this contract which has been marked Exhibit 11, and the three letters which you read, the whole of the agreement under which electric energy has been sold by the Torrington Company to the respondent, and all modifications or changes in that contract?

* * * * * * [*462*]

The Witness: Do I understand that part of the question is from the period covered from August, 1935, up to the date of [*463*] this hearing?

By Mr. Wahrenbrock: *Q* Yes, sir. *A* No, they do not.

Q Will you explain? *A*. As I testified here yesterday, two or three weeks ago—I have forgotten the exact date—I meant to have looked it up this morning but unfortunately I forgot to do so—a different arrangement was entered into with the Torrington Company whereby the power to be supplied to us was generated at Torrington, at their steam plant, and none of the power which they received from the Connecticut Power Company was to be delivered to us, and the price to be paid was the same price which had formerly been paid under the old contract, plus the out of pocket expense that the Torrington Company incurred in operating its steam plant, less the amount that the Torrington Company would have paid the Connecticut Power Company if it had continued to receive from the Connecticut Power Company the power which it delivered to us.

Q Now, do I understand you to say that that is a purely oral agreement, negotiated between you and Mr. Travis? *A* Correct.

Q You referred in your testimony yesterday to a letter, concerning some of the terms of that agreement which you had written. Will you explain about that? [464] *A* I think I said that I thought I had written a letter, but I find upon examination of my files that that is not the case; no such letter was written.

Q Is this oral agreement the only understanding or agreement or modification other than those set forth in the contract, this and the letters you read?

Mr. Branch: From what date to what date?

By Mr. Wahrenbrock: *Q* For the same period as previously specified, that is, from August, 1935 to the time of this hearing. *A* That is all.

* * * * * * [466]

Q Will you explain now about the negotiations leading up to and following the March, 1941 modification of the contract? *A* I saw Mr. Travis.

Q What day was that? *A* I expect it was the day before my letter of March 19th.

Q So it would be on the 18th? *A* The 18th of March, I would expect. And I discussed the matter with him.

Q Was that the first time you had discussed it with anybody from the Torrington Company? *A* Yes.

Q Had there been any discussions with anybody of the Torrington Company prior to that time? *A* In respect to the arrangement that was then contemplated to be made?

Q With respect to any modification of the prior contract. *A* I don't think so.

Q You don't think so. Who had been handling that in your organization? *A* I had.

Q Had you had engineering advice? [467] *A* Yes, sir.

Q With whom had you discussed it on the engineering aspects?

Mr. Branch: Excuse me. The train was making a little noise. May I have the question read?

(The question is repeated.)

The Witness: I had discussed it with Mr. R. H. Knowlton, who

is the executive vice president of our company, and with J. E. King,—Mr. King is vice president in charge of engineering and construction, of our company—the feasibility, practicability and economics involved in our exercising the right that we had under the contract to supply our Winsted properties with power from our own system and discontinue purchasing power from Torrington. And they made a study, an investigation, and based upon that investigation, it indicated that it was an economically sound thing for us to do. We could save money by doing it.

Q When did you first take it up with Mr. Knowlton and Mr. King? *A* Well, I should say probably in February.

Q You initiated the inquiry? *A* Yes.

Q When did they complete their investigation and make a report? *A* I should say early in March.

[*468*] *Q* What was the occasion of your initiating the inquiry? *A* I don't know that I quite understand what you mean by "occasion".

Q What brought it to your attention? *A* Well, we are constantly looking over our situation to see whether we can obtain the necessary supplies, either of power or anything else, on a more advantageous basis than we are now supplying it, and that was one of the reasons.

Q What were the other reasons? *A* The other reasons were that we felt that we had understood that there might be some question in the minds of the Federal Power Commission whether the arrangements that then existed did or did not involve us in interstate commerce, and in pursuance of the long-established policy of the company to avoid any possible interstate commerce transactions, we looked into this thing and finding that it was profitable to do so and economically sound to do so, we authorized the work to be proceeded with.

Q In what you have just said, you speak of "we". Whom do you refer to? *A* The company.

[*469*] *Q* Well, what individuals? *A* Well, as I determine the policy of the company subject to the Board of Directors, I deter-

mined it, and obtained authority from the Board of Directors to spend the necessary money to make the interconnection.

Q Was it a matter that had been brought to your attention by your attorneys? *A* You mean the economic soundness of this?

Q The matter of obtaining a new source of supply. *A* No, I can't say that it was. We had discussed the fact that there was this situation there, and that it was believed that the Federal Power Commission might claim that that was a transaction in interstate commerce.

Q Who had discussed that? *A* Myself and our attorneys.

Q The attorneys of Day, Berry & Howard? *A* Yes.

Q When did those discussions take place? *A* Oh, I don't know.

Q Did they take place after January 7, 1941? *A* Well, I can't recall the date. We had so many discussions with Day, Berry & Howard—they are our general counsel—we are in constant consultation with them, and I can't recall any particular date.

Q You did discuss this matter with your attorneys before [470] taking it up with the Board of Directors? *A* Oh, yes.

Q Was this matter initiated by your attorneys or by you? *A* It was initiated by me.

Q The discussion was initiated by you? *A* The discussion?

Q Yes, with your attorneys. *A* That I can't recall. I don't recall who initiated the discussions.

Q Unless your attorneys brought it to your attention, what happened that might have brougt it to your mind that this was a matter to be considered? *A* Well, as I say, the general practice of the Company was to constantly review all of our matters with a view of determining whether we can improve from an economic or service point of view our business methods.

Q Had such a review been made for you by any of your staff? *A* Yes, I just stated it had been made.

Q By whom? *A* By Mr. Knowlton and Mr. King.

Q No, I refer to preceding the time you asked them to make a study. *A* No.

Q There had been no general review which brought up this [*471*] or any other matter for your consideration? *A* No.

Q Then what did bring it to your mind the first time? *A* Well, I can't recall, sir, what brought it to my mind.

Q Did anything else bring it to your mind than the suggestion by the attorneys? *A* It might have. I don't know.

Q But you don't recall that anything else did? *A* No, nor I don't recall that it was their suggestion that it was.

Q But you do recall you did discuss this matter with them before you took it up with your Board of Directors? *A* Yes.

Q Did your attorneys give you any written opinion or memorandum in connection with the matter? *A* Oh, no.

Q Do you recall discussing it more than once with them? *A* Well, I think it depends what you mean by recall. I don't actually visualize any particular occasion when I did talk to them at all about it. But I do know that the matter was talked over. Whether it was talked over once or twenty times, I couldn't begin to tell you. I expect what happened was that after discussing it with the attorneys, then having received the reports from the engineers which indicated that from an economic standpoint it was the proper thing for us to [*472*] do, we then took it up with the Board of Directors, obtained the appropriation, or the authority to make the necessary capital expenditure, and then I went over to negotiate with Mr. Travis, whether or not he would hold us to that full one-year's notice or would let us off in case we were ready to do it earlier.

* * * * * * [*473*]

By Mr. Wahrenbrock: *Q* You stated that the company already owned part of the right-of-way by which it proposes to obtain a new source of supply for Winsted? *A* All of it.

Q All of it? *A* Yes.

[*474*] *Q* Between what points does that right of way lie? *A* Well, I am not sufficiently familiar with the layout of our lines to explain.

Q From which extremes, roughly. *A* Roughly, from Waterbury up to the line of Winsted.

* * * * * * [478]

Q I believe you stated earlier that you conducted the negotiations leading up to the more recent further modification of the power contract, or the recent agreement for a new source of supply in Torrington, pending the completion of your own source of supply? *A* Yes.

Q Did you initiate that proposal? *A* My recollection is that that idea first came to me from one of our engineers, who stated that he had understood that the Torrington Company had quite recently completed a revamping of its steam plants, and that if his information was correct, that that steam plant was then of adequate capacity to supply our entire Winsted load, and therefore it might be a good idea to hitch our load to that Winsted plant—I mean the Torrington plant, to give the Torrington plant a chance to be tried out in actual service.

Q Why did he make that suggestion to you? *A* I don't know.

Q Who was he? *A* I don't recall. One of our engineers.

Q Was it Mr. Knowlton or Mr. King? *A* It was probably Mr. King.

Q Mr. King was familiar with the company's desire to avoid a ground for the Federal Power Commission asserting jurisdiction? *A* Oh, yes. Everybody in the company is well aware of [479] that. That has been well advertised.

Q And the proposal was made along that line? *A* I don't know exactly. That may have prompted him to do it.

Q It offered a further means of accomplishing that result? *A* Yes.

Q And that was the reason for its consideration by you? *A* Yes.

* * * * * * [480]

By Mr. Wahrenbrock: *Q* Mr. Campbell, is your company now receiving electric energy from the Torrington Electric Light Company at Winsted? *A* Yes, sir.

Q How is that being supplied now? *A* Over a line which is connected to the steam generating plant of the Torrington Electric Light Company.

Q And is that a new temporary line? *A* No, it is a line that was used for the service before this present arrangement.

Q Using the existing switching facilities of the Torrington Electric Light Company? *A* That is an engineering feature, which I cannot testify to.

Q You don't know whether some temporary construction was put in? *A* Oh, yes, sir; I know that a short piece of temporary construction was put in to connect the line directly with the steam power plant of the Torrington Electric Light Company.

Q Some of your engineers have knowledge of the details? *A* Yes, there will be an engineer, I believe, who will testify to that. Not being an engineer, I hesitate about trying to do so.

[*481*] *Q* And at the present time, you are receiving electric energy which is being generated by the Torrington Electric Light Company in its Torrington steam plant? *A* Yes, sir.

Q How long has that been true? *A* Well, I should say it is almost a month—three weeks. Frankly, I have not got the exact date here. It is ascertainable.

* * * * * * [*483*]

By Mr. Wahrenbrock: *Q* Mr. Campbell, I wish to refer now to the contract which your company had with the Borough of Groton, first the contract made the 31st day of March, 1930, and ask you whether that contract, which is attached to the stipulation which has been signed by counsel was ever filed in the form prescribed by the Federal Power Commission orders 36, 44 and 50?

* * * * * *

By Mr. Wahrenbrock: *Q* Has that contract been filed with the Federal Power Commission since August 26th, 1935?

Mr. Branch: I am not sure whether the question means on [*484*] file although actually sent before that time, or the filing since that time. I think that matter should be clarified.

Trial Examiner: As I understand your question, Mr. Wahren-

Brock, what you want to know is whether it has been filed at any time since August 26th, 1935?

Mr. Wahrenbrock: Yes, sir.

Trial Examiner: With that understanding, you may answer the question.

The Witness: The company did undertake and endeavor to file with the Commission in January, 1935, all existing contracts of this character, and it is my belief that the file was complete. It is a large company, and it may have been that some contract was inadvertently omitted from that filing made in January, 1935, therefore, I cannot answer from my recollection whether this particular contract which would have been filed unless it had been overlooked, in January, 1935, was subsequently filed again after August, 1935. I don't recall; I don't know.

By Mr. Wahrenbrock: *Q* On your direct examination, as I recall, you stated that the statement in one of the sub-paragraphs, paragraph 12 of the answer that additional contracts and modifications had been filed was erroneous, and I wanted to follow that up and for that purpose I will ask you whether the agreement of June 5, 1935 between the Connecticut Light and Power Company and the Borough of Groton was filed with the Federal Power Commission? [*485*] *A* I don't recall just what has been filed in a particular instance, with the Commission. I do not keep it in mind. The files of the Commission ought to disclose whether it has been filed or not.

Q Mr. Campbell, I believe you stated on direct examination that you have had a study made to determine what had been filed? *A* Yes, sir.

Q And did that study show you whether this agreement had been filed? *A* I have refreshed my memory. I find that the investigation shows that additional contracts with other utilities have not been filed.

Q And those contracts would, of course, include this contract? *A* Yes.

Q The one which is attached to the stipulation, dated June 5, 1935? *A* Yes.

Q And the same thing is true of the memorandum of agreement between the Connecticut Light and Power Company and the Borough of Groton, executed the 15th day of November, 1935?

Mr. Branch: What is that?

Mr. Wahrenbrock: That is attached to the stipulation and follows after the one I last referred to. I will show it to the witness. The date is at the end of the agreement.

[*486*] (Handing paper to the witness.)

Mr. Branch: The "same being true",—meaning that it was not filed? Is that the meaning?

Mr. Wahrenbrock: That the study made by the witness shows that it was not filed.

The Witness: The study that we made shows that all of the things that were referred to in paragraph 12 of the answer were filed, except our additional contracts with other utilities.

Now, I find it frankly very difficult, with the large number of contracts that we have, to be precise as to any one particular contract, and I would take it from this study that has been made that this contract has not been filed, but I do not want to be put in a position of giving false testimony if it should develop that that particular contract was filed in connection with some other matters, perhaps.

By Mr. Wahrenbrock: *Q* I understand, and my information is, that they were not filed, and I wanted to give you an opportunity to state whether any of them had been filed. *A* Not so far as I know.

Q And the study was made for the purpose of ascertaining whether they had been, and it does not reveal that this agreement of November 15th, 1935, was filed? *A* That is right. May I just say this. There is just [*487*] one possible misunderstanding, that there might be on this, that I think in justice to myself I ought to clear up. The reference is made to other utilities in our answer, item 12, and also in the memorandum that was given to me, of the study that was made. Now, whether the Borough of Groton would be held by this to be another utility—

Q (Interrupting) But you have no knowledge or basis for say-

ing that these I have referred to with the Borough of Groton have been filed with the Federal Power Commission? *A* Probably they were not filed.

Mr. Branch: By "those that were referred to" you referred to the recent ones, and not to the original one, Mr. Wahrenbrock? There have been so many that I would like to have that clear.

Trial Examiner: Do you mean, Mr. Wahrenbrock, that you referred to the ones dated June and November, 1935?

Mr. Wahrenbrock: I mean all of those with the Borough of Groton to which I have referred except that one dated March 31, 1930.

Trial Examiner: Does that clarify the point, Mr. Campbell?

The Witness: Yes, sir.

Mr. Branch: Is there a question pending now, sir? I think perhaps Mr. Campbell answered your question, but not the one pending. I suggest that we have a new question now.

By Mr. Wahrenbrock: [488] *Q* In other words, Mr. Campbell, the Company has not filed any of its contracts for the sale of power for resale since the contracts which were filed very early in the year 1935, in response to the inquiry sent out in connection with our National Power Survey? *A* That is correct.

* * * * * * [502]

Redirect Examination by Mr. BRANCH.

* * * * * * [509]

ALVAN WALDO HYDE,

a witness called on behalf of the Respondent, being first duly sworn, testified as follows:

Direct Examination by Mr. BRANCH.

Q Mr. Hyde, will you state your name. *A* My name is Alvan Waldo Hyde.

Q Where do you reside? *A* In Hartford, Connecticut.

Q What is your position? *A* I am an attorney at law.

Q Will you please state your education and experience. *A* I was educated in the public schools of Hartford, graduated from the Yale University in 1902, and from the Harvard Law School in

1905. I began the general practice of law in that year with the firm of Gross, Hyde & Shipman, and continued with Gross, Hyde & Shipman after it became Gross, Gross & Hyde, and then Gross, Hyde & Williams, and that is the present name of the firm. I continued with the firm until I was appointed to the Public Utility Commission of Connecticut, [*510*] in November, 1934, by Governor Cross. From that date to the present I have been giving substantially all my time to the duties of that Commission. My specified term ended on June 30, 1941.

Q In what courts have you practiced? *A* In the courts of the State of Connecticut, United States District Court for the District of Connecticut, the United States Supreme Court, and the United States Court of Claims.

Q Are you familiar with the Connecticut statutes relating to the incorporation and operation of the public utility? *A* I am.

* * * * * * [*514*]

By Mr. Branch: *Q* What authority is necessary for the conduct of the Public Service Electric companies in Connecticut?

Trial Examiner: I don't think that question is material.

Mr. Branch: I think you stated that under an unfavorable ruling an exception is noted, and I think that applies to questions of mine when the objection is sustained.

Trial Examiner: That is right.

* * * * * * [*519*]

Mr. Wahrenbrock: May I ask to have the pending question read?

Mr. Branch: I will be glad to read it: "If an electric company incorporated in Connecticut does all of its business in Connecticut, owns or operates no property outside of Connecticut, owns or operates no lines connecting at the Connecticut State line with any other utility, has no contract or arrange- [*520*] ments for the sale or receipt of electric energy outside of Connecticut or at the Connecticut State line, purchases no electric energy from a company which generates it outside of Connecticut, and sells no electric energy to a company located outside of Connecticut, has the Connecticut Public Utilities Commission jurisdiction over all of the

rates, facilities and contracts, wholesale and retail, of that company?

Mr. Wahrenbrock: Mr. Examiner, carefully listening to that question as it was re-read, I can see absolutely no relevancy under the decisions of the Commission or the decisions of the courts to that statement.

Trial Examiner: I would suggest that it be limited. If counsel desires to ask whether the Public Utilities Commission has so considered its authority, that is another question.

Mr. Branch: I was going to ask that later. I would like to get his conclusion first.

Trial Examiner: I do not think that his conclusion, except as to what the attitude of the Commission is, would be material here, in view of the fact that the question may more properly be made a matter of briefs.

* * * * * * [*521*]

By Mr. Branch: *Q* I will ask this question—whether the Connecticut Commission has asserted authority over contracts, retail and wholesale, and over the rates and facilities of such companies as I have described.

* * * * * * [*522*]

Q Now, Mr. Hyde, will you answer the question in regard to what the Public Utilities Commission of Connecticut has done, and cite, if you will, cases in which the Connecticut Commission has acted, and cases in the courts of this State? *A* The Connecticut Commission has acted and asserted jurisdiction in such cases. There have been several decisions of the courts to the effect that utility rates existing pursuant to contract are subject to modification through the rate-making authority of the Public Utilities Commission. These decisions do not depend in any degree upon the nature of the rate, either as to quantity or classification of customers. The principle followed is a broader one, that a State may not be deprived of its authority under its police power by the execution of a private contract. Some of these decisions are *Ansonia v. Ansonia Water Company*, 101 Conn., 151.

Trial Examiner: Are these decisions of your Commission?

The Witness: Two of them are appeals from the decisions of the Commission, decided by the Supreme Court of the State, upholding the power of the Commission.

* * * * * * [*525*]

Q The question I asked you is this question. I think it is numbered 9 in the draft you have there:

Is a contract for the sale of electric energy at wholesale, that is, to a company which is to distribute and resell it, subject to the jurisdiction of the Connecticut Commission if all of the facilities of both of the parties to it are located in Connecticut?

Mr. Wahrenbrock: Now, Mr. Examiner, I am going to specify a further ground of objection, that insufficient facts have been shown to express an opinion. It does not appear where the energy is consumed, it does not appear where it is generated. Those are some facts which should be in such a question.

[*526*] Trial Examiner: The point is well taken in that respect. I think a hypothetical question should be complete.

Mr. Branch: Do I understand the objection is sustained?

Trial Examiner: Objection sustained.

Mr. Branch: I except on the ground that that in itself is a complete statement, that these other things need not be considered, and I offer to prove that the answer to that question would be in the affirmative.

* * * * * * [*527*]

Q Mr. Hyde, if under a contract for sale at wholesale of electric energy between two Connecticut companies, it appeared that some of the energy sold had been generated outside of the State before it was purchased by and delivered to the seller within the State, and if it was then transmitted within the State by the seller, would that affect the jurisdiction of the Connecticut Commission over the rates and the contract?

Mr. Wahrenbrock: Mr. Examiner, I will object to that. That will require a consideration of Utah *vs.* Pfost, and the Duke Power Company and all the other cases of the Supreme Court of the

United States on the subject, and we do not need to have an expert swear to them. We will have our own opinions on it in any event.

Trial Examiner: I think that is true. If he were limited as to whether it would make any difference to the State Commission in taking jurisdiction, that would be another matter. If you limited your question to that, it might be admissible.

Mr. Branch: I understand the objection is sustained?

Trial Examiner: Yes.

Mr. Branch: And I take an exception and I offer to prove [*528*] that the answer to the question which was just asked would be in the negative.

By Mr. Branch: *Q* And I will ask you, Mr. Hyde, whether the facts in the question which I just asked and that you did not answer, actually had prevented the Connecticut Commission from taking jurisdiction over rates and contracts?

Mr. Wahrenbrock: Mr. Examiner, on that point my objection is as previously stated, and in addition that it is wholly immaterial to any question under the Federal Power Act what the State Commission has as a matter of fact done. We do not need any evidence on that, and all the evidence in the world that they have assumed jurisdiction does not make any difference.

Trial Examiner: I think there may be a very slight and tenuous connection there. However, I will permit the answer.

The Witness: They have not.

By Mr. Branch: *Q* Will you explain, Mr. Hyde.

Mr. Wahrenbrock: I object to that for the same reason, Mr. Examiner.

Trial Examiner: I think the explanation is out of order. The fact of what the Commission has or has not done may be in order, but not the explanation why.

Mr. Branch: I should like an exception to what I understand is a ruling sustaining the objection as to the question.

[*529*] Trial Examiner: Yes.

Mr. Branch: And I will say I would offer to prove that the Public Utilities Commission of Connecticut has complete jurisdic-

tion over the rates in any contract that is wholly performed within the State, that the Connecticut Commission, although the Connecticut Commission would not have jurisdiction over rates and contracts between the seller and the company in the other States which sold it the power which was generated in another State, if the contract is between a company which ultimately purchased the energy and its seller, the mere fact that the energy was purchased and had been generated outside of the State would not make any difference and has not made any difference in the practice of the Connecticut Commission.

Mr. Wahrenbrock: Mr. Examiner, I would like to move at this point that this entire line of questioning be stopped. It is taking time. It is serving only the purpose of having lawyers argue law at the hearing, and as I suggested, this is a fact finding hearing and not a law finding hearing. We will take care of the law in our briefs. Counsel is, of course, entitled to make his offers of proof if he sees fit to do so, but I suggest that he be allowed to make his offers of proof in his brief instead of taking time and having it transcribed by the reporter.

Trial Examiner: Suppose we listen to the completion of [*530*] his offer for the present. Is that all you have to offer on that now?

Mr. Branch: No, sir, I have quite a bit more.

Trial Examiner: I was going to ask you if that was a general question of law or an offer of proof.

Mr. Branch: I am sorry, I did not hear what you said, Mr. Examiner.

Trial Examiner: I was going to ask you if you were making a general statement of the law or just a statement of what you proposed to prove by the witness as to the practice of the Connecticut Commission?

Mr. Branch: That I said was just a statement of what I offered to prove by the witness.

Trial Examiner: As to the practice of the Connecticut Commission?

Mr. Branch: Yes.

Trial Examiner: And not as to the law generally?

Mr. Branch: No, sir.

By Mr. Branch: *Q* Has the Connecticut Commission the power and the duty to prescribe a uniform system of accounts for electric companies in the State of Connecticut?

Mr. Wahrenbrock: I object to that for the reasons as stated, Mr. Examiner.

Trial Examiner: I will permit the witness to answer the [*531*] question.

The Witness: It has.

By Mr. Branch: *Q* Has the Connecticut Commission prescribed such a uniform system, and if so, will you state where such a system was prescribed and changed from time to time?

Mr. Wahrenbrock: I object to that question, Mr. Examiner.

Trial Examiner: I question the materiality of that. The Commission has ruled in previous cases that the fact that a uniform system of accounts was prescribed by State Commissions and that the utility was obliged to submit to that uniform system of accounts has no relation to the necessity for them coming under the Federal system of accounts if they were public utilities within the Federal statutes. They are not relieved by the fact that they are required to file with the States.

Mr. Branch: Your Honor's answer sustains the objection?

Trial Examiner: I sustain the objection that it is not material.

Mr. Branch: And I take an exception. I offer to prove that the Commission has prescribed such a system, that at first such a system was first prescribed in November, 1923, that it was revised, the revision to become effective January 1, 1941, so as to adopt with a few modifications the System of Accounts approved by the National Association of Railroad and Utilities Commissioners.

* * * * * * [*540*]

By Mr. Branch: *Q* I have asked you several questions in the present tense, Mr. Hyde as to what the Connecticut Commission is doing, and what authority it has, and I ask you whether the

answers to all of the questions which I have asked would be the same as of the entire time since August 26, 1925?

Mr. Wahrenbrock: I object on the grounds previously stated, and on the further ground that the question is so broad as to be— I object on the same grounds as previously stated.

Trial Examiner: The objection is sustained.

Mr. Branch: If the objection to the question is sustained on the ground that it is too broad, I will have to go back—

Mr. Wahrenbrock: I withdraw that.

[*541*] Mr. Branch: I offer to show that the present powers of the Commission have been unchanged in respect to the matters which I have asked about, since July 1, 1935. The Commission has exercised full authority continuously since that time. And that applies not only to the questions which the witness was permitted to make answer to, but also to the questions as to which objection has been sustained.

* * * * * * [*546*]

Q Mr. Hyde, in the course of your service as Commissioner of Public Utilities, did you form an opinion as to the meaning of the terms "Facilities for transmission", and "Facilities for local distribution of an electric company"?

Mr. Wahrenbrock: I must ask that that question be read.

Trial Examiner: Will you read it?

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Wahrenbrock: Mr. Examiner, I must object to trying to prove by an expert as to the construction to be put on the terms in the Federal Power Act.

* * * * * * [*548*]

By Mr. Branch: *Q* Have you had occasion, Mr. Hyde, to consider the meaning of these terms in regard to the facilities of an electric company such as the Connecticut Light and Power Company, in connection with its relations to the Public Utilities Commission of Connecticut? *A* Yes.

Q And what, in your opinion, is the meaning of the term "facilities for transmission" and "facilities for local distribution", of an electric company?

Mr. Wahrenbrock: I object to that. It is not specified as to the purpose for which the terms are used, or where they are used.

Trial Examiner: If you will restrict that to the Connecticut law, I think the witness can answer it—to the Connecticut Commission Statute.

Mr. Wahrenbrock: I should like to observe, Mr. Examiner, that it also should be further tied to what particular statute, [*549*] what particular purpose the connotation is, the context in which the terms are used, if they are used, and it hasn't even been shown that they are used. Terms may have one meaning when used in one connection and another when used in another. We will have to have some basis laid before such a question can become relevant.

Trial Examiner: I think if there is more than one sense in which it is used in the Connecticut statute, the Commissioner may be able to explain that.

Mr. Branch: Do I understand, your Honor—

Trial Examiner: If you will limit yourself to the Connecticut law.

Mr. Branch: If your Honor, as I understand, sustains the objection to the broader form of the question I wish to present—and I understand my broader form is objected to,—

Trial Examiner: It is objected to and it is sustained, and you have an exception,

Mr. Branch: I will put the question now which you suggest.

By Mr. Branch: *Q* Did you hear the Examiner's question, Mr. Hyde, the Examiner's suggestion as to the form of the question? *A* I don't know whether I formed any opinion as to the use of either words as used in a particular statute.

Mr. Branch: Will you read the Commissioner's comment just before I spoke?

[*550*] (The record was read.)

By Mr. Branch: *Q* Have you had occasion in connection with

your duties with the Connecticut Public Utilities Commission, to use those terms, as applied to the Connecticut Light and Power Company, Mr. Hyde?

Mr. Wahrenbrock: I object to that unless it be specified what purpose the terms are used for, and the purpose shown to be relevant to the present inquiry.

Trial Examiner: I think that it advisable that it be tied to the present inquiry. There is some question as to the degree to which it applies. It may be wholly immaterial.

Mr. Branch: The objection is sustained, I take it, and may my exception be noted?

Trial Examiner: Your exception will be noted.

Mr. Branch: Before making the offer, I will go a little further.

By Mr. Branch: *Q* Does the Connecticut Uniform System of Accounts contain a definition of those terms, or either of them, Mr. Hyde?

Mr. Wahrenbrock: Mr. Examiner, I object to that question as having no relevancy.

Trial Examiner: It is not material.

Mr. Wahrenbrock: May I amend my remarks by saying that what meaning terms may be given for accounting purposes is [*551*] obviously an arbitrary meaning to serve the ends which accounting serves. A given facility may not warrant being classified accurately, so that it must be fitted into an arbitrary classification, and what a term may be given as a meaning for accounting purposes has no necessary relation whatever to the meaning of that term when used for engineering purposes or when used in a statute for other than accounting purposes.

Trial Examiner: I think the point is well taken and it is immaterial anyway as to what the definition in the Connecticut law is. That is irrelevant to this case.

Mr. Branch: Please note my exception to that ruling.

Trial Examiner: Your exception will be noted.

Mr. Branch: I will just say it seems to me the only way to show the meaning of terms is to show how they are used and defined,

and the attempt of counsel for the Federal Power Commission to question a meaning which has been adopted not only by the Connecticut but also by the Federal Power Commission itself, seems to me rather thin.

Mr. Wahrenbrock: I must resent that comment, and I must explain I have not objected to any offer of proof to show the technical meaning of a term used for the purpose for which any term is used in the Federal Power Act. I have objected to offers of proof to prove the same terms used for different purposes in something unrelated to the Federal Power Act.

Trial Examiner: I think your position is well taken. [*552*] The objection, Mr. Branch, was to the use of it in the Connecticut statutes, and the question has not been raised as to the definition of the term in the Federal Power Act.

Mr. Branch: I hope you will understand, sir, I am not trying to get you to change your ruling after you have ruled. It is my practice not to do that, where I feel you have considered the matter, as I have realized that you have, but to protect my rights, I wish to go ahead in this way. I have forgotten whether I have asked this question or not.

By Mr. Branch: *Q* Have you an opinion as to the meaning of the terms "facilities for transmission" and "facilities for local distribution" of an electric company, as used generally in the industry, Mr. Hyde?

Mr. Wahrenbrock: I object to that in the absence of a showing that the terms are used, and the purposes for which they are used, and the specification of the purposes for which they are used.

Trial Examiner: I think the question is not sufficiently narrowed to show its application.

Mr. Branch: I would like an exception.

Trial Examiner: You may have an exception.

Mr. Branch: I offer to show that the distinction between the terms must be found from a study of the functions which such facilities are intended to perform. [*553*] I have forgotten

whether I have asked this question or not, and you will understand I am not trying to get you to change your ruling if I have.

Mr. Wahrenbrock: I—

Mr. Branch: May I have ordinary decency and be allowed to go ahead?

Mr. Wahrenbrock: Certainly. I wished to ask to have your offer of proof read. I didn't understand.

Mr. Branch: Will you wait until I have finished?

Trial Examiner: I think that Mr. Wahrenbrock made the same mistake I made in thinking you were starting to ask another question. You may complete your offer of proof.

Mr. Branch: I wish to show that the Connecticut system of accounts contains a definition, and that the definition includes the following:

> "Stations which change electric energy from transmission to distribution voltage shall be classified as distribution stations."

Now, Mr. Wahrenbrock, if you wish something to be read, I will pause.

Mr. Wahrenbrock: Mr. Examiner, may the reporter read the offer of proof?

Trial Examiner: The reporter will read the full offer of proof. I think this is probably an appropriate time to take a re- [554] cess.

(A short recess was here taken.)

(After a short recess, the hearing is resumed.)

Trial Examiner: The hearing will be in order. The reporter will read the offer of proof as requested.

(The same is read as follows:

> "Mr. Branch: I offer to show that the distinction between the terms must be found from a study of the functions which such facilities are intended to perform.")

Mr. Wahrenbrock: Mr. Examiner, as to the proof of that fact

I have no objection, but I have not understood any of the questions which were asked and to which I made objection as calling for that answer, and I believe therefore that the offer of proof goes outside the reasonably to be anticipated answers to the questions which were asked, and if a question is asked which calls for proof on that point, I think then we can let the offer of proof which has been made, stand.

Mr. Branch: I think I also stated, either before or after that, stations which change energy from transmission to distribution voltage shall be classified as distribution stations in the Connecticut Accounts.

By Mr. Branch: *Q* I will ask you, Mr. Hyde, so that there will be no doubt about it, whether in your opinion, the distinction, if there is any distinction between the terms "facilities for [555] transmission" and "facilities for local distribution", of an electric company, must be found from a study of the functions which such facilities are intended to perform?

Mr. Wahrenbrock: If you will pardon my slowness in grasping what you read with such facility there, Mr. Branch, I would like to have that read.

(The question is repeated.)

Mr. Wahrenbrock: Mr. Examiner, that question does not specify the purpose for which the distinction referred to, if any, is a distinction. Because of that failure to specify that, I object to the question.

Trial Examiner: It is very general in its language, and the answer suggested by your offer of proof would not be objectionable, but what it would lead to that is material, I cannot determine.

Mr. Branch: I thought that I was following precisely the suggestion which had been made by counsel on the other side. After I had done that I find it is still objectionable. I asked whether for all purposes that you know of for classifying facilities for transmission and facilities for local distribution of an electric company, Mr. Hyde, the distinction must be found from a study of function which such facilities are intended to perform?

Mr. Wahrenbrock: Because the question says "for all purposes" and I think it is too broad and I must object to it [556] on that ground.

Trial Examiner: Do you mean for each purpose, or for all purposes? Do you persist in making it for all purposes, or would you make that question, "for each purpose"?

Mr. Branch: I prefer to frame it, sir, the way I have.

Mr. Wahrenbrock: I object to it as framed.

Trial Examiner: I think as framed the question shows no sufficient relation to the case at issue and the objection will be sustained.

Mr. Branch: My exception is noted, and I offer to prove that the answer to that question would be in the affirmative.

By Mr. Branch: *Q* I ask you whether for all purposes you would regard stations which change energy from transmission to distribution voltage as distribution stations?

Mr. Wahrenbrock: I object to that question for the same reason.

Trial Examiner: I think the objection is proper.

Mr. Branch: And may my exception be noted?

Trial Examiner: Your exception is noted.

Mr. Branch: And I offer to prove that the answer would be in the affirmative.

By Mr. Branch: *Q* Do you know whether there is a classification or definition of "facilities for local distribution" of an electric [557] company in the uniform system of accounts for public utilities of the National Association of Railroad and Utilities Commissioners?

Mr. Wahrenbrock: I object to that question on the same grounds as I objected to formerly to the testimony for the definition of the terms "for accounting purposes."

Trial Examiner: I fail to see the relevancy of any provisions adopted by the National Association. Objection sustained.

Mr. Branch: Exception. I offer to prove that in the system to which I have just referred is substantially the following:

"Stations which change energy from transmission to distribution voltage shall be classified as distribution stations."

By Mr. Branch: *Q* Do you know whether the uniform system of accounts of the Federal Power Commission contains any definition or classification which would include facilities for local distribution, Mr. Hyde?

Mr. Wahrenbrock: Mr. Examiner, I object to that question. The Commission can certainly notice the terms of its own uniform system of accounts.

Trial Examiner: The objection is in order.

Mr. Branch: May my exception be noted.

[*558*] Trial Examiner: Yes.

Mr. Branch: I offer to prove that it contains the following—it may not be verbatim, for I cannot lay my hands on the original, but my notes indicate:

"Stations which change energy from transmission to distribution voltage shall be classified as distribution stations."

Mr. Wahrenbrock: Mr. Examiner, can we not avoid some unnecessarily misleading offers here?

Trial Examiner: I do not think the offers of proof need be gone into in detail in regard to the answers to the questions.

Mr. Wahrenbrock: I have no recollection that there is such a provision in our uniform system of accounts. I may be in error.

Mr. Branch: I will show it to you. I respectfully bow to your Honor's ruling, but I must say that in no other tribunal in which I have practiced, have I ever had counsel object to my making offers of proof to preserve my rights.

Trial Examiner: That is all right for you to go into then, in as narrow a compass as possible. I am inclined to think that in a few cases you have gone a little beyond the necessities of an offer to prove, and I would suggest that you confine it to as narrow bounds as possible.

Mr. Branch: I could have gotten all through these offers if I had not been continually interrupted. I am finding it a [*559*] little

difficult to be patient with continual interruptions. It seems to me that we do have certain rights here to protect our rights. On page 52 of the Federal Power Commission's uniform system of accounts appears—this edition I have is revised to December 31, 1936, effective January 1, 1937, and I will read the whole title.

> "Uniform system of accounts prescribed for public utilities and licensees, subject to the provisions of the Federal Power Act."

I call attention to all the paragraphs marked 16, or the Section marked 16 on page 5, and particularly the following which is designated as among "Stations which change energy from transmission to distribution voltage shall be classified as distribution stations."

* * * * * * [566]

Mr. Howard: May it please the Examiner, we ask that the Commission take notice of the following sections of the statutes of Connecticut. Referring first to the General Statutes, Revision of 1930, we ask that they notice Sections 522 to 543 inclusive. We ask that they notice Sections 3577, 3587 inclusive. Also Sections 3589 to 3594 inclusive. Also Sections 3596, 3598 and 3599 and 3600, and Sections 3606 to 3609 inclusive. There is a question here whether I mentioned 3602, 3603 and 3604. I supposed I had, but I do desire that the Commission take notice of those sections.

Trial Examiner: You had not.

Mr. Howard: Then at the expense possibly of repeating, Sections 3606 to 3609, inclusive; Sections 3614, 3617, 3619, 3817, 3820, 3822, 3827, 3832 to 3835 inclusive. And Sections 3846 and 3847. Section 5970. And then in the Cumulative Supplement to the General Statutes—and this is for the year 1935—Sections 1412-C to 1415-C inclusive. Also for the year 1935, Section 1420-C to 1423-C. Then for the year 1939, continuing in the Cumulative Supplement, Sections 1197-E to 1198-E, pointing out that 1198-E is the same as Section 711-D of the previous

session. Also there have been three Acts affecting utilities which have been passed by the present session of the General Assembly [567] and which became effective July 1st, but unfortunately have not yet been engrossed, and for that reason I have not yet been able to get a copy.

Trial Examiner: Will you be able, before the hearing is over, to get me the bill number or the Act number in case they are not in volume form yet?

Mr. Howard: The Revision Commissioner has his work to do and whether he will get it done before the end of the session, I am not certain. I can give you now the Bill numbers, I believe. Substitute Senate Bill 512, and Substitute Senate Bill 513. The other is a bill which was raised in committee and I believe has no number, but it related to rural extensions of electric lines. I honestly expected to be able to furnish copies before this hearing is concluded.

* * * * * * [*612*]

ALBERT N. TIFFANY,

a witness produced on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q You have given your name to the reporter. Now, will you give your address. *A* My business address is 359 Thames Street, Groton, [*613*] Connecticut.

Q Mr. Tiffany, what position do you hold? *A* I am called superintendent of the Borough of Groton Water & Electric Department.

Q Is that a department of the Borough of Groton? *A* That is a department of the Borough of Groton.

Q What is the relation, if any, of that department to the Board of Utility Commissioners? *A* The Board of Utility Commissioners are the operating commissioners for the utilities of the Borough of Groton.

Q That board is a part of the government of the Borough of Groton? *A* No.

Q How are its members appointed? *A* Its members are appointed one each for four years.

Q By whom? *A* The wardens and burgesses of the Borough of Groton, the governing body.

Q Is there another adjoining borough to the Borough of Groton known as the Borough of Groton Long Point? *A* Yes, sir. That does not adjoin the Borough of Groton; it is in the same town, but does not adjoin the Borough of Groton.

Q It is a separate borough? *A* That is right.

[*614*] *Q* Separately governed? *A* Yes, sir.

Q Is there any connection between the Board of Utility Commissioners of the Borough of Groton and the Borough of Groton Long Point? *A* No.

Q What is your position in that department? *A* I am superintendent appointed by the Utility Commissioner.

Q How long have you been superintendent? *A* Nearly fourteen years.

Q Did you have a connection with that department prior to your appointment as superintendent? *A* Yes, as an employee.

Q As an employee? *A* Yes.

Q What is the total length of time you have been associated with the department? *A* Approximately fourteen and a half years.

Q Are you an engineer? *A* I am registered in the State of Connecticut as an engineer.

Q And you were educated as an engineer? *A* No.

Q Will you describe what documents and papers you have brought with you in response to the subpoena duces tecum [*615*] which was served upon you? *A* I was subpoenaed to bring four documents.

No. 1, the agreement of March 31, 1930, between the Borough of Groton and the Connecticut Light & Power Company for the

sale of electric energy to the Borough of Groton. I have that document.

No. 2: The agreement of June 5, 1935, between the Borough of Groton and the Connecticut Light & Power Company amending the agreement of March 31, 1930. I have that document.

No. 3: The agreement for the sale of electric energy by the Connecticut Light & Power Company to the Borough of Groton under which sales have been made to the Borough of Groton since the termination of the agreement of March 31, 1930, as amended. I have that document.

No. 4: The agreements dated March 1, 1929, and June 15, 1935, between the Borough of Groton and the Fishers Island Farms, Incorporated, for the sale of electric energy to Fishers Island Farms, Incorporated. I have part of that document; the first part dated March 1, 1929 I am unable to find in my records.

Q Mr. Tiffany, did you bring any reports or correspondence or memoranda, legal opinions, minutes of meetings of the Board of Utility Commissioners? *A* Yes, sir.

[*616*] *Q* With relation to those agreements that you have spoken of? *A* Yes, sir.

Q Have you those with you? *A* The greater part I have with me.

Q Will you describe what you have done to locate and bring those with you? *A* I have located the original documents as submitted to the Federal Power Commission upon their request concerning the Borough of Groton, the Connecticut Light & Power Company, the Fishers Island Farms, Incorporated, correspondence between Fishers Island Farms, Incorporated, and correspondence with and from the Federal Power Commission.

Q Those are all documents which you had submitted to the Federal Power Commission at its request prior to the service of the subpoena upon you? *A* All of those that I have been able to find are here. There are one or two omissions. They also include other documents which were pertinent to the facts requested to substitute for those which I do not have the original copies of.

Q If there is anything there that you have not previously called to our attention by correspondence or otherwise in response to our requests, I would like to have an opportunity to examine them outside of the hearing. For the present, I think we may pass that by. That completes your statement of what [*617*] you have done in response to the subpoena, does it? *A* Yes, sir.

Mr. Wahrenbrock: The Examiner will understand that Mr. Tiffany was subpoenaed to testify at the request of the respondent, and a subpoena duces tecum addressed to the Borough and to Mr. Tiffany was issued and served at the request of Commission counsel.

By Mr. Wahrenbrock: *Q* In what territory does the Borough of Groton Electric Department operate electric utility facilities? *A* In the Town of Groton and partially in the Town of Ledyard.

Q Does that territory extend beyond the limits of the Borough of Groton? *A* Yes.

Q Does it include part of the territory of the Borough of Groton Long Point? *A* Yes.

Q And does it include the territory between those boroughs? *A* Yes, sir.

Q In that area. are you engaged in the business of selling electric energy and distributing the same? *A* Yes, sir.

Q Will you describe in very general terms the nature of the facilities owned for that purpose? [*618*] *A* The facilities as owned by the Borough of Groton in that territory consist of a secondary sub-station at a point near the eastern boundary of the Borough of Groton. You will pardon me for asking this,—do you want me to describe it as it is as of today?

Q I just want a general description of the nature of your facilities. Let me make the question more specific. Does the Borough of Groton have any generating facilities? *A* No.

Q It is engaged only in distributing electric energy and transmitting electric energy throughout its territory? *A* Yes.

Q Where does the Borough obtain its supply of electric energy?

Where has it obtained its supply of electric energy since August, 1935? *A* From the Connecticut Light & Power Company.

[*619*] *Q* In the territory which you describe, is the Borough of Groton the only supplier of electric service? *A* Yes.

Q I show you an agreement dated March 31, 1930, which is part of the stipulation which has been offered in this case, and ask you if—and I show you also the following agreement attached to the same stipulation, being an agreement dated June 5, 1935, and ask you whether those are copies of the agreements under which the Borough of Groton obtained its supply of electric energy from the Connecticut Light & Power Company from August, 1935, until some recent time?

Mr. Branch: I object to the question on the ground "some recent time" is too vague.

Trial Examiner: I would suggest that Commission's counsel clarify his language in regard to that.

Mr. Wahrenbrock: At any time after August 26, 1935.

Trial Examiner: Until what time.

By Mr. Wahrenbrock: *Q* Are those contracts that I have referred to contracts under which the Borough of Groton has received electric energy from the Connecticut Light and Power Company at any time after August 26, 1935? *A* Yes.

Q How long did the Borough of Groton continue to receive electric energy under those contracts? [*620*] *A* Until September 29th, I believe, 1940.

Q Thank you. After that time, where did the Borough of Groton obtain its supply of electric energy? *A* From the same source.

Q Under what arrangement or agreement? *A* A letter of agreement.

Q A letter of agreement? *A* That is right.

Q Can you identify that letter? What was the date of the letter? *A* June 14, 1940.

Q I show you a letter of that date on the letterhead of the

Connecticut Light and Power Company attached to the same stipulation—

Mr. Branch: Excuse me. May I have the last question and answer read?

Trial Examiner: The reporter may read it.

(Whereupon the last question as above recorded, was read by the reporter.)

Q (Continuing)—attached to the same stipulation to which I previously referred, and ask you if that is the letter you refer to? *A* It is.

Q How long did the Borough of Groton continue to receive electric energy from the Connecticut Light and Power Company [*621*] under the terms of that letter? *A* We are still continuing to receive energy under the terms of that letter.

Q How was the contract of March 31, 1930, and as modified by the agreement of June 5, 1935, terminated? *A* By agreement by either party on one year's notification.

Q That is to say, that is the means by which it could have been terminated? *A* It could have been.

Q Now, how was it terminated? *A* It was terminated by the Connecticut Light and Power Company advising the Borough of Groton, Water and Electric Department, that they did not wish to —I will go back. I will have to go back and refer to correspondence.

Q I show you a letter dated September 27, 1939, on the letterhead of the Connecticut Light and Power Company, signed by A. V. S. Lindsley, Vice-President, attached to the stipulation, and ask you if that is the letter to which you refer? *A* Yes.

Q It is? *A* It is.

Q After receiving that notice, did you write a letter to the Connecticut Light & Power Company, or some employee or official of that company, in which you spoke of the abruptness of that letter of cancellation, on or about the 22nd of [*622*] November, 1939? *A* I don't appear to have that letter in these files here.

Q Do you have any independent recollection of writing such a

letter to the Connecticut Light and Power Company? *A* I remember a conversation to that effect.

Q Who was that conversation with?

Mr. Branch: I think I will object at this point. I don't see what possible bearing on any issue in this case a conversation had, even if the contracts themselves, or the terminations are material, and it certainly hasn't appeared yet—all that would be material would be contractual relations, and any conversations of that nature, unless they constituted an agreement, obviously would be inadmissible.

Trial Examiner: Will counsel state the purpose for which he desires to admit this conversation.

Mr. Wahrenbrock: The purpose will appear that the Connecticut Light and Power Company terminated this contractual relationship as a part of its scheme to avoid jurisdiction of the Federal Power Commission.

Trial Examiner: I think with that in view it is admissible. If the purpose is not sustained and the relevancy not shown later, counsel may move to strike the testimony.

Mr. Branch: Will you note my exception?

Trial Examiner: Your exception is noted.

Mr. Branch: It seems to me—I want to make it clear [623] I am not acceding to the proposition that even if any relationship with the issues in this case were the purpose, that that would be at all material.

Mr. Wahrenbrock: I will ask another question of Mr. Tiffany.

By Mr. Wahrenbrock. *Q* Had you had any intimation before you received this notice of cancellation— *A* No.

Mr. Branch: Wait. Just a minute, please.

By Mr. Wahrenbrock: *Q* Had you had any intimation of the intention of the company to terminate the contract prior to this notice of cancellation?

Mr. Branch: I object to it as immaterial and irrelevant. The contracts provide for a year's notice, and a year's notice apparently was given.

Trial Examiner: I don't see the materiality of the question. Counsel may state the reason why he thinks it is.

Mr. Wahrenbrock: I have subpoenaed this witness, Mr. Examiner, and while I have met him before and discussed some of the physical arrangements, and while he has furnished some of the correspondence to the Federal Power Commission, I have not discussed his testimony. I think it is obvious that any man called upon to testify to the details of transactions some months or years past, must have his recollection refreshed, [*624*] and I have to take a few details before I can establish the more pertinent parts of this testimony. I think it will become obvious if we may proceed without too much delay. The more interruptions there are, the more it becomes necessary to ask additional questions.

Trial Examiner: You may proceed with the answer to this question. The exception will be noted.

The Witness: I can't give a complete answer yes or no.

By Mr. Wahrenbrock: *Q* Will you answer in so far as you can?

Mr. Branch: May it be stipulated that my objection goes to the entire line of inquiry as to conversations or lack of conversations, so that I won't have to keep interrupting Mr. Tiffany.

Trial Examiner: You may. Your exception is noted.

By Mr. Wahrenbrock: *Q* Had you had any previous intimation of the company's intentions to terminate this contract, or to require you to make any other arrangements? *A* No.

Q Did you seek an explanation of the reason for the company's action?

Mr. Branch: Same objection.

Trial Examiner: The objection is overruled.

The Witness: The reason was submitted prior to the [*625*] termination.

By Mr. Wahrenbrock: *Q* They informed you of their reasons for that? *A* No.

Q I don't understand what you mean. *A* We had endeavored for many months prior to the termination of this one year clause

to negotiate a new contract, and we received at no time no satisfactory answer to our pleas.

Q After you had received a notice of termination of the contract, did you have any meetings with the representatives of the company with respect to the termination? *A* I believe so.

* * * * * * [629]

Q Mr. Tiffany, after you received the notice of termination of the contract, did you have a conversation with representatives of the Company, in which they explained to you their reasons for their action in giving you the notice? *A* Yes, sir.

Q Did representatives of the Company attend a meeting of the Board of Commissioners in Groton on or about the 13th [*630*] of December of that year?

* * * * * *

A Yes.

Q You said "Yes"? *A* Yes.

* * * * * * [*631*]

Q I call your attention to the letter of June 14th, 1940, to which you have previously referred, and which is attached to the Stipulation, and particularly to the second sentence of that letter which reads—this is a letter addressed to you from the Connecticut Light and Power Company and signed for the company by A. V. S. Lindsley, Vice President:

> "When the Borough is in a position to contract for a supply of electric power for resale and ultimate use entirely within the chartered territory of the Borough of Groton, we will be glad to enter into a new agreement to furnish the electrical requirements, under the conditions which we discussed and considered mutually agreeable on June 11th, 1940. They are substantially as follows":—

Now, referring to that, can you say whether in these conversations which you have had and in the conversations which you had on December 13th, with the representatives of the Company, they explained to you their position in that connection?

* * * * * * [632]

The Witness: Yes.

By Mr. Wahrenbrock: *Q* What was that explanation? *A* That explanation was that we were exceeding our charter rights in furnishing energy outside of the State, and they could not negotiate another contract with the Borough of Groton until we discontinued serving out of the State firms, for instance, Fishers Island Farms.

[633] *Q* Who made that explanation to you? *A* Mr. Lindsley.

Q Mr. Lindsley. Mr. A. V. S. Lindsley? *A* Yes, sir.

Q Was Mr. Larabee present? *A* I believe he was present at that time.

Q Was this on the 13th of December? *A* I cannot definitely say without referring to further records.

Q Was the occasion prior to a meeting of the Board? *A* Yes.

Q In the evening? *A* Yes.

Q Did they explain to you why it was a matter of interest to them that you not sell to the Fishers Island Farms? *A* No.

* * * * * *

Q Did they explain to you why they had not raised the point before? [634] *A* No.

Q Did you ask them? *A* I had asked them for some little time why we could not have a new contract upon the termination of the old contract.

* * * * * *

Q Had the company ever raised any objection to your sale to Fishers Island? *A* No.

Mr. Branch: I object.

Trial Examiner: Objection overruled.

By Mr. Wahrenbrock: *Q* Will you answer? *A* I did answer —No.

Q They had never before made any objection to your resale of electric energy to Fishers Island? *A* No.

Q What else was said about their reasons for giving the cancellation notice?

[635] Mr. Branch: I understand my objection goes to all of this?

Trial Examiner: Your objection stands. I will have to see how far the answer goes.

The Witness: It was suggested by the Connecticut Light & Power Company that they did not want to supply the Borough of Groton, having knowledge that the chartered territory of the Borough of Groton did not include Fishers Island.

By Mr. Wahrenbrock: *Q* Did they tell you that that provision of the charter had just recently come to their attention? *A* No.

Q Did they refer to any legal advice that they had received on that point? *A* Yes.

Q Will you explain? *A* They referred to the opinion of the firm of Day, Berry & Howard, I am quite sure, whose opinion they either read or gave to me.

Q Have you a copy of that? *A* No.

Q Did they indicate to you that you would not receive any electric energy after the expiration of the year's notice? *A* No.

Q What did they say about your future supply of electric [636] energy? *A* They submitted a letter stating—a letter which is now in evidence in the court, June 14th—

Trial Examiner: (Interrupting) Will you speak a little louder?

The Witness: They submitted a letter which is now in evidence, stating the terms under which we could continue to purchase electric power, and also a letter which suggests the form of the new type of contract.

By Mr. Wahrenbrock: *Q* That was done on June 14th, 1940? *A* I have that second letter here.

Q I show you the letter of June 14th, 1940, attached to the Stipulation. Is that the letter to which you refer? *A* (Examining letter). Yes.

Q Prior to the receipt of that letter, and particularly referring to the conversation you had with Mr. Lindsley and Mr. Larabee, if it was Mr. Larabee, on the 13th of December, did they indicate to

you then what their course of action would be when the one year period had expired?

* * * * * * [637]

Trial Examiner: Do you understand the question?

The Witness: Yes. My answer is "Yes".

* * * * * * [639]

By Mr. Wahrenbrock: *Q* What did they tell you?

* * * * * *

The Witness: They told us, after we had discontinued supplying power to Fishers Island Farms, they would negotiate a new contract, having in mind especially new labor costs, value of current, and/or other unforeseen factors.

By Mr. Wahrenbrock: *Q* Did any representative of the company at that time and in that connection mention to you the proceedings of the Federal Power Commission against the Hartford Electric Light Company? *A* No.

Q Did you have any conversations at any other times with representatives of the company at which they gave you any more explanation of their reasons for desiring that you discontinue [640] selling to Fishers Island? *A* Yes.

* * * * * *

The Witness: The desire of the Connecticut Light and Power Company was that there would be no physical connection between our lines and Fishers Island.

By Mr. Wahrenbrock: *Q* Will you tell us when and where you had some of these conversations? *A* As far back as more than a year prior to the one year's termination of our contract. At that time, my department corresponded to considerable length with the Connecticut Light and Power Company in an effort to have a contract renewal, and we have not as yet any contract with the Connecticut Light and Power Company.

* * * * * * [642]

Q Can you describe the facilities by which the Connecticut

Light and Power Company delivers electric energy to the Borough of Groton? *A* At what time?

Q I would like to get a description covering the whole period of time since August 26th, 1935. If there have been changes during the last six years, perhaps the easiest way would be to begin at the more recent times and go back.

Mr. Branch: Excuse me. I understood what you just said, but I don't understand the question, if it is related to making a question. May I either have it read or will you [643] restate it?

Trial Examiner: Read the question, Mr. Reporter, for the benefit of counsel.

Mr. Branch: I understood what he said this last time, but there was no question there, that is my difficulty.

(The question was read.)

Trial Examiner: I think that covers the whole situation.

The Witness: As of today, the Connecticut Light and Power Company supplies us power to the high voltage terminals of a substation located near the Borough of Groton.

By Mr. Wahrenbrock: *Q* What is the name of that substation? *A* Commonly known as Trails Corners Station.

Q You say at the high voltage terminals of a transmission line? *A* Not as of today. High voltage terminals of a substation.

Q And where do they obtain the electric energy and how do they bring it to that point? *A* By a transmission line, whose nearest generating station is at Montville, Connecticut.

Q What is the voltage of that line? *A* 33,000 volts.

Q Is it a two-circuit or single circuit line? *A* Two-circuit.

[644] *Q* Steel tower? *A* Wooden construction.

Q What does their sub-station consist of? *A* Consists of one 1,000 KVA three-phase 33,000 volt, 60 cycle primary, to 2,300 volt secondary three-phase.

Q Is the electric energy delivered to you at 2,300 volts? *A* I have not finished the answer to your other question.

Q Excuse me. *A* There are also two 500 KVA transformers of the same characteristics.

Q At what voltage is the electric energy delivered to you? *A* At the present time, due to construction, it is delivered to us at 2,300 volts by our equipment.

Mr. Wahrenbrock: May I have that answer repeated?

(The answer is repeated.)

The Witness: At the present time, the equipment of the Connecticut Light and Power Company is in the process of overhauling and putting back on the line—the metering equipment.

Mr. Wahrenbrock: May I have the answer read now?

(The record is read.)

By Mr. Wahrenbrock: [645] *Q* Is that correct? *A* Yes.

Q Will you explain? I don't fully understand it. *A* I will be glad to. The Borough of Groton is at the present time erecting a sub-station to replace the sub-station now owned by the Connecticut Light and Power Company, and during the course of this construction, the metering equipment which we formerly used is now out of service and we are using secondary metering equipment of the Borough of Groton.

Q The electric energy which the Borough is now purchasing is being metered on the low tension side of the transformers? *A* That is right.

Q Formerly it was on the high-tension side? *A* That is right.

Q Will you describe the facilities for delivery of electric energy to the Borough prior to the last change? *A* From the two lines coming from Montville to our substations, there were two additional lines metered at the Trails Corners Substation, and going in a southerly and easterly direction to another substation at Groton Long Point, where it was further reduced in voltage to another substation, to transmit to Groton Long Point and to distribute to Fishers Island.

[646] *Q* At that time, that is, immediately prior to this last change, when you were receiving electric energy at Trails Corner, and at Groton Long Point high tension sub-station, did the Connecticut Light and Power Company own the transformers at the Trails Corner Substation? *A* At that time it did.

Q Did they own the transformers at Groton Long Point High-tension Substation? *A* They were being purchased by the Borough of Groton on a monthly payment basis. We had the title to the transformers.

Q And had the Connecticut Light and Power Company previously owned the transformers at the Groton Long Point High Tension Substation? *A* Yes.

Q When did you obtain title from them to those transformers? *A* June 15th, 1937.

Q Had the Connecticut Light and Power Company owned those transformers at all times prior to that date, back to August 26th, 1935? *A* They had owned them at all times that they were there. I don't recall the date.

Q Were those transformers installed prior to 1935? *A* I don't think so. I think in negotiating the new contract with the Fishers Island Farms, in 1935, new equipment [*647*] was required. At least as to the transformers that you speak of now.

Q Were these transformers in the Groton Long Point High Tension Substation installed at the time of the negotiation of a new contract for the sale of electric energy to Fishers Island? *A* I believe so.

Q I show you an agreement attached to the Stipulation and dated the 15th day of June, 1935, and signed by the Borough of Groton Utility Commissioners and the Fishers Island Farms, Inc. and ask you if that is the agreement to which you referred? *A* Yes.

Q Is that agreement—

Mr. Wahrenbrock: I withdraw that.

Q And it was at the time of the negotiation of that agreement that the step-down transformers in the Groton Long Point High Tension Substation were installed? *A* I believe so.

Q Who installed those transformers?

Mr. Branch: What is "that agreement"? You withdrew some question, and there has not been anything identified as to that, and I think it ought to be more definite.

Mr. Wahrenbrock: The agreement of June 15th, 1935, between the Borough of Groton and Fishers Island Farms, Inc., to which [648] I previously referred.

Mr. Branch: Will you show me a copy of that?

Mr. Wahrenbrock: It is attached to the Stipulation.

Mr. Branch: Have you it right there?

Mr. Wahrenbrock: Yes.

Mr. Branch: Never mind. I have it.

Mr. Wahrenbrock: Now, may my question be re-read?

The Witness: I remember the question.

Mr. Wahrenbrock: I don't; I am sorry. Will the reporter read it to me?

Trial Examiner: The reporter will read the question for the benefit of counsel.

(The question is read.)

By Mr. Wahrenbrock: *Q* Will you answer that question now, please? *A* Connecticut Light and Power Company.

Q What was the purpose of installing those transformers? *A* Increased load to Fishers Island and Groton Long Point.

Q What is that? *A* Increased requirements of Fishers Island Farms and Groton Long Point.

Trial Examiner: Do I understand you to mean to meet the increased requirements?

The Witness: That is right.

[649] By Mr. Wahrenbrock: *Q* That is, those transformers were installed to meet the load requirements which would follow from the increased demand on Fishers Island. *A* And Groton Long Point.

Q And Groton Long Point? *A* Yes.

Q I wish to return now for a moment in my questions to the Trails Corner Substation, and ask you who owned the step-down transformers there prior to the last change, that is, the present temporary conditions under which you are operating? *A* Connecticut Light and Power Company.

Q Will you describe those transformers, please? *A* They con-

sisted of three transformers, one 1,000 KVA and two 500 KVA three-phase transformers, from 33,000 to 2,300 volts, with taps.

Q How long had they been in position? *A* More than fifteen years—I will qualify that. Two of them were there more than fifteen years and one was there before I came, but it was moved to Groton Long Point and again returned to that Trails Corner Substation.

Q Did the Connecticut Light and Power Company own any other facilities in that substation? *A* At one time, yes.

[*650*] *Q* When was that? *A* I might answer the question in a way that I don't think has been clarified. There were two parts of that substation. After the energy was reduced to 2,300 volts then it went to a small building for distribution. The other equipment of the Connecticut Light and Power Company consisted of the metering equipment and lighting arresters and the structure itself.

Q And the Connecticut Light and Power Company owned the metering equipment and the lightning arresters at all times, after August 26th, 1935, down to the last date that you spoke of? *A* Yes.

Q Will you describe the transformers at the Groton Long Point High Tension Substation which were installed approximately at the time the June 15th, 1935 agreement was entered into?

Mr. Branch: I object. I don't know whether this has significance or not, but there is no evidence that the Groton Long Point substation is a High Tension substation, if that is the way it was designated. May I have the question read?

Trial Examiner: Read the question.

(The question is read.)

Mr. Branch: I don't know the significance of that, but I think there is no testimony designating it as a high tension [*651*] substation.

Trial Examiner: I think the question might be modified to meet your objection by striking out the words "high tension", unless there is some reason for it?

Mr. Wahrenbrock: There is, Mr. Examiner. I will be very

glad to clear it up, if I may interrupt then, with a few other questions.

[652] *Q* You previously referred to a sub-station in Groton, Long Point, at which the electric energy is stepped down—at which the voltage is stepped down from 33,000 volts, have you not? *A* Yes.

Q Is there another sub-station in Groton Long Point? *A* Yes.

Q How do you distinguish those two sub-stations, the one from the other, by name? *A* The brick sub-station.

Q And in the voltage stepped down from a nominal voltage of 6900, stepped down to a nominal voltage of—I withdraw that question. Will you describe the brick sub-station? *A* The brick sub-station contains 6900 volt switching equipment, and also 2300 volt switching equipment, together with meters, and in 1935—that is the date we are talking of?

Q Yes. *A* (Continuing)—contained voltage regulators.

Q How do you designate the other sub-station in Groton Long Point? *A* The Connecticut Light and Power Company, high voltage sub-station.

Q The Connecticut Light and Power, high voltage sub-station? *A* Yes.

[653] *Q* Will you describe the transformers in the Connecticut Light and Power Company, high voltage sub-station at Groton Long Point, which were installed about the time of the June 15, 1935, contract?

Mr. Branch: Excuse me. I again must make the same objection as to the use of "high tension" which I think was used.

Trial Examiner: I think the words "high voltage" have been shown to be descriptive of the station, and in that respect I think it is permissible. The objection is overruled.

By Mr. Wahrenbrock; *Q* Will you answer? *A* This station consists of two incoming lines of 33,000 volts.

Q When you say it consists, you are speaking of it as of the time of the installation of the transformers in 1935? *A* To the best of my knowledge and belief.

Q Will you continue? *A* There is a combination of wood and steel framework to use as buf supports, and one section as a line section, approximately 200 feet, before the lines get to the sub-station; there are two gang operated, high voltage switches, one for either circuit—one for each circuit, rather. There was also in 1935 a 7500 volt oil switch, manually operated, on the 6900 volt side of the three single phase transformers which were in the station. These transformers were of 400 KVA [654] 33,000 to 6900, with per cent taps.

Q The condition you have just described was—that was as of the time of the negotiation of the June 15, 1935 contract, is that right? *A* I believe that is the correct date.

Q Now, what changes were subsequently made in that sub-station? *A* It was subsequently abandoned.

Q Was that the first change that was made? *A* Except minor repairs, yes.

Q When was the sub-station—

Mr. Branch: Excuse me. May I have that last answer read?

(Whereupon the last answer as above recorded, was read by the reporter.)

By Mr. Wahrenbrock: *Q* When was the sub-station abandoned? *A* In February, 1941.

Q How long did the Connecticut Light and Power Company remain the owner of the sub-station? *A* Approximately 1937, at which time—excuse me. Do you wish me to continue?

Q Yes, if you will, please.

Mr. Branch: I think the best evidence is the instrument which effected the sale—the deed, or the bill of sale, or whatever it was—instead of asking the witness to give his [655] recollection. I think we ought to get it from the instrument itself.

Mr. Wahrenbrock: I have no objection.

Trial Examiner: The best evidence would be as suggested. Would it be possible to get the instrument and put it in evidence.

Mr. Wahrenbrock: I have no objection to the respondent furnishing the instrument if they have it. I don't have it.

Mr. Examiner, my present question only goes to the approximate time.

Mr. Branch: Why not have it right instead of asking the witness to try to remember something that happened years ago? In the stipulation, Mr. Wahrenbrock, I think is an instrument—

Mr. Wahrenbrock: Thank you for the suggestion.

Mr. Branch: The stipulation contains that instrument which states that the Borough is exercising its right to purchase that, and that seems to be dated November 15, 1935.

Mr. Wahrenbrock: Thank you for calling that to my attention.

By Mr. Wahrenbrock: *Q* Mr. Tiffany, I show you the memoranda of an agreement to which Mr. Branch has just referred to, agreed to and accepted the 15th day of November, 1935, and I ask you if by referring to that you are able to refresh your recollection as to the time—

[656] *A* (Interrupting) That is.

Q (Continuing)—as to the time when the Borough of Groton acquired the Connecticut Light and Power Company sub-station in Groton Long Point. *A* That is right.

Q What would you say then is the time when the Borough of Groton did acquire that sub-station? *A* The 15th day of November, 1935.

Q Did the Connecticut Light and Power Company retain the ownership of the 33,000 volt line between the Trails Corner sub-station and the so-called Connecticut Light and Power Company sub-station at Groton Long Point? *A* They did for some little time.

Q How long did they retain that? *A* Until late in 1940.

Mr. Branch: May I state for the record that I have here a copy of a bill of sale from the Connecticut Light and Power Company to the Borough of Groton which transfers and conveys poles, wires, fixtures, of every kind, located in the Town of Groton, consisting of electric lines, and so forth, extending from Trails Corner sub-station to Groton Long Point sub-station—Trails Corner sub-station of the vendor, the Connecticut Light and Power Company,

to the Groton Long Point, the vendee, and that is dated July 19, 1940. Will you accept that date?

[657] Mr. Wahrenbrock: Thank you for that.

By Mr. Wahrenbrock: *Q* Do you recognize that date? *A* Except I was not authorized to accept it as of that date. It was accepted in August by the Board of Commissioners.

Q Can you fix that date? *A* About August, 1940.

Q Thank you. Except for the present situation, has the energy which has been delivered to the Borough of Groton always been metered at 33,000 volts at Trails Corner sub-station? *A* From 1935?

Q Yes. *A* Yes.

Q And those meters have always been owned by the Connecticut Light and Power Company? *A* Yes.

* * * * * *

Q I wish to refer back to what you said about the termination of the contract for sale of power to the Borough of Groton by the Connecticut Light and Power Company, and ask you if the failure to execute a new contract has given rise to any difficulty in your operation of your department? *A* Yes.

* * * * * *

Q Will you describe what those difficulties have been?

* * * * * *

The Witness: We primarily lost a valuable customer. We [660] had upon our hands electrical equipment which was of no further value to us except junk value, and we have no facilities now to supply customers who have since developed.

* * * * * *

By Mr. Wahrenbrock: *Q* To what customer did you refer? *A* Fishers Island Farms.

Q Did you lose any other customers by reason of the failure of the Connecticut Light and Power Company to negotiate a contract? *A* Yes.

Q What was that customer?

* * * * * *

The Witness: The Electric Boat Company.

By Mr. Wahrenbrock: *Q* Is the Electric Boat Company in your territory? *A* Yes, sir.

[*661*] *Q* Will you explain—

Trial Examiner: Will you define the territory a little closer?

Mr. Wahrenbrock: I would be glad to have the—

Trial Examiner: Do you refer to the two townships in that respect?

By Mr. Wahrenbrock: *Q* Will you explain where the Electric Boat Company is with reference to your territory? *A* All of our chartered territory is within the Town of Groton, and the Electric Boat Company is in the town of Groton and also in the Borough of Groton.

Trial Examiner: That clarifies the point. I think you referred to the two points.

By Mr. Wahrenbrock: *Q* Is the Electric Boat Company being served by somebody? *A* It is.

Q By whom? *A* The Connecticut Light and Power Company.

Q In your territory? *A* Yes.

Q Is the Connecticut Light and Power Company serving anybody else in your territory? *A* No, except us.

Q Well, now, how is this due to the failure of the [*662*] Connecticut Light and Power Company to enter into a further contract with you? *A* Because we had no contract for resale. We had no contract for purchase, consequently we could offer no contract for resale.

Q That is, you could not enter into a contract to sell to the Electric Boat Company as long as you did not have a contract for purchase? *A* That is right.

* * * * * * [*668*]

By Mr. Wahrenbrock: *Q* Are you familiar with the submarine cables or the location of the submarine cables by which Fishers

Island Farms, Inc. took the electric energy which they purchased from you, at Fishers Island? *A* Yes.

Q I show you the map of Fishers Island, New York, showing the area served by the Fishers Island Farms Inc., which is a part of Exhibit 16 for Identification, and I ask you if by looking at that map and by comparing it with any data of your own you [669] are able to say whether the submarine cables which are indicated on that map that I show you are the submarine cables by which Fishers Island Farms, Inc. took the electric energy which they purchased from you, to Fishers Island.

Mr. Wahrenbrock: May the record show that the witness is comparing the map to which I have referred with maps of his own.

Trial Examiner: It will be so noted.

The Witness: Yes.

By Mr. Wahrenbrock: *Q* The map I have shown you does correctly represent submarine cables by which Fishers Island Farms, Inc. took the electric energy to Fishers Island? *A* Yes.

Q I notice on this map that there are three lines shown from Groton Long Point towards the Sound, two approximately parallel with the one apparently branching off at an angle. Will you explain about the line which is marked "abandoned, 1935", or do you have knowledge of that? *A* I do.

Q Will you explain it? *A* That line was the original cable and the only cable to Fishers Island at the time of the original contract with Fishers Island, in 1929, I believe. That cable was damaged several times prior to its replacement. That cable was operated [670] at 2,300 volts primarily, subsequently operated at 6,600 volts. On account of the many failures in the cable it was abandoned and a new cable and substitute connections were installed.

Q Approximately when was the new cable installed? *A* 1935.

Q In 1935? *A* Yes.

Q And the new cable which was installed in 1935 is the cable which is approximately parallel to that first cable? *A* Yes.

Q When was the first cable which is shown at a considerable

angle to those two installed? *A* I would have to refer to further records.

Q I show you the third sheet in Exhibit 17 and direct your attention to the date shown on that exhibit which is shown by a stamp, "Permit Drawing 253/A/5/8/22," and the line across Fishers Island Sound, and I ask you if you recognize that as referring to the first cable abandoned in 1935, to which you have referred?

Mr. Wahrenbrock: May the record show that the witness is again comparing the map I show him with maps of his own?

Trial Examiner: It will be so noted.

The Witness: Yes.

Mr. Wahrenbrock: I now turn to the 7th sheet of Exhibit 17 which is entitled "Proposed Submarine Cable across Fishers [*671*] Island Sound, from Groton Long Point Connecticut to Chocomount Cove, Fishers Island, application by Fishers Island Farms, Inc." and ask you if the line across Fishers Island Sound shows the submarine cable which was subsequently installed at an angle to the 1922 and the 1935 cables, to which you have referred? *A* That is the Chocomount cable which also I have my own identification of.

Q And I turn to the next sheet in the same exhibit and ask you what cable is shown by that map? *A* That is the same cable.

Q That is the same Chocomount Cove cable? *A* Yes.

Q I refer you to the part of Exhibit 17 which is the War Department permit under date of March 19th, 1931, and ask you whether that refreshes your recollection as to the date or the approximate date of the construction of the Chocomount Cove Submarine cable? *A* I know it was there at that time.

Q That is, beginning in 1931 or earlier? *A* It may have been earlier.

Q Then do I understand that from August 26th, 1935, on there were two submarine cables in operation from Groton Long Point to Fishers Island? *A* Yes.

[*672*] Mr. Branch: Up to what time?

By Mr. Wahrenbrock: *Q* How long did that continue in operation? *A* They discontinued the cable operation on March 1st, 1941—pardon me—1940.

Q 1940? *A* Yes.

Q Will you explain how reliable electric service to Fishers Island by means of these submarine cables was? *A* The reliability of service was considered normal at the time that the Borough of Groton and the Fishers Island Farms worked together for repairs.

Q Are you acquainted with the location of the principal electric facilities on Fishers Island up to the time of the termination of service by you to Fishers Island? *A* Yes.

Q I show you the map which is part of Exhibit 16 for Identification, and ask you if that appears to you to be a correct representation according to its terms, of the facilities on Fishers Island? *A* Yes, sir.

Mr. Branch: I object. I do not see what possible bearing the facilities on Fishers Island have on this case.

Trial Examiner: The objection is overruled.

By Mr. Wahrenbrock: [673] *Q* Do you know how the Fisher's Island Electric Corporation is now obtaining electric energy to supply its needs on Fishers Island? *A* Not from personal observation.

Q Do you have knowledge that satisfies you as to its reliability as to how they are obtaining their supply of electric energy? *A* Yes.

* * * * * * [676]

By Mr. Wahrenbrock: *Q* Mr. Tiffany, I am going to show you —I show you the annual report of the Borough of Groton, Water & Electric Department, on FPC Form No. 96, to the Federal Power Commission, for the year ended December 31, 1939, and to Schedule 530 [677] thereof—

Trial Examiner: Has counsel had an opportunity to see a copy of it?

Mr. Wahrenbrock: On page 508—I show it to counsel. Hav-

ing shown it to counsel, to their edification, I now show it to the witness, and ask him—

By Mr. Wahrenbrock: *Q* Preliminary to that, I show him the last page and ask him if this report was signed by him? *A* Yes.

Q I turn now to the page to which I referred, and ask you why no report was made on that page of the electric energy sold to Fishers Island Farms, Incorporated. I am not sure whether by that time Fishers Island Farms, Incorporated, had sold its—transferred its facilities—I am not sure whether it transferred its facilities to the Fishers Island Electric Company or not, but it was one of those corporations, but why were not your electric sales to one or the other of those two corporations not shown there?

* * * * * * [*680*]

Trial Examiner: I would suggest that you withdraw that question, and ask the question first as to whether it actually is shown in the record. I believe your question was as to why. I suggest that you withdraw that and ask the other question first.

Mr. Wahrenbrock: I would be glad to.

By Mr. Wahrenbrock: *Q* Does that schedule show your sales to the Borough of Groton—from the Borough of Groton to Fishers Island? *A* No.

* * * * * * [*683*]

Q Mr. Tiffany, did the officials of the Connecticut Light [*684*] and Power Company have knowledge at all times since 1935 up to the beginning of 1941, that the Borough of Groton was selling electric energy to Fishers Island?

Mr. Branch: I will admit that in order to shorten it.

* * * * * *

The Witness: I was informed by the legal department of the Connecticut Light and Power Company that we were serving power beyond our charter limits. Then I know it. It was between 1935 and today.

* * * * * * [*685*]

By Mr. Wahrenbrock: *Q* I show you the last photostat attached

to Exhibit 16, and ask you if you recognize the letter of which that is a copy?

Trial Examiner: That is Exhibit 16 for Identification.

Mr. Wahrenbrock: That is the last photostat attached to the stipulation.

Trial Examiner: You said Exhibit 16.

Mr. Wahrenbrock: I am sorry. I misspoke myself.

By Mr. Wahrenbrock: *Q* This is a copy of the letter that you wrote to the Federal Power Commission on October 17th, 1940? *A* Yes.

Q And are the statements therein made true?

* * * * * *

The Witness: I identify it, yes.

[*686*] By Mr. Wahrenbrock: *Q* And the question was, are the statements which are made therein true? *A* Yes.

* * * * * * [*704*]

(Photostat referred to was marked Exhibit Number 18 for Identification.)

* * * * * *

Q And that is a photostat of the piece of paper which you have in your possession and before you? *A* Yes.

Q And the paper which you have before you, is that a [*705*] carbon copy of the original which was sent to the Federal Power Commission? *A* Yes.

* * * * * *

By Mr. Wahrenbrock: *Q* Mr. Tiffany, can you explain how a signed carbon copy of this letter which you sent to the Federal Power Commission got into the possession of the respondents? *A* Yes.

Q Will you do so, please? *A* I gave it to the counsel for the respondent.

Q You gave the photostats to the counsel for the respondent? *A* No, the copy.

Q The signed carbon copy? *A* The initialed carbon copy.

Q The initialed carbon copy? *A* Yes, sir.

Q When was that? *A* Within the past month.

Q Who requested you for that? *A* Mr.—I cannot recall his name.

[*706*] Mr. Branch: Mr. O. D. Smith.

The Witness: Mr. Smith, yes.

By Mr. Wahrenbrock: *Q* How did he happen to know of the existence of the letter? *A* He inquired of my office if I had any furher correspondence pertinent to this case.

* * * * * *

Q Now, Mr. Tiffany, yesterday, I understood you to testify that prior to December 13, 1939, you had had conversations with Mr. Lindsley or Mr. Larabee or possibly both of [*707*] them, in which they discussed with you the Company's reason for terminating the contract between the Company and the Borough. I wish to ask you now whether after that time and during 1940, you had any conversations with Mr. Larabee or Mr. Lindsley or other representatives of the Company in which you discussed with them their reasons for terminating the contract?

* * * * * *

The Witness: Yes, sir.

* * * * * *

By Mr. Wahrenbrock: *Q* Will you state what was said? *A* There were many conversations and many topics, sir. I [*708*] cannot recall all of those topics.

Q Can you recall what they said as to the Company's reasons for insisting that you cease to serve Fishers Island before they would give you a further contract? *A* Yes, I can.

Q Will you tell that? *A* The reason as indicated and also as given to me was that the Borough of Groton did not have charter rights to serve Fishers Island Farms with electricity and they did not desire to be accessory to the fact that they were to be served.

Q I did not understand the last. *A* They did not desire to be

accessory to the fact that electricity would be sold to Fishers Island Farms through the facilities of the Borough of Groton.

Q Did they tell you why? *A* Not at that time.

Q Did they tell you why at any time? *A* They had expressed to me in oral conversations their desire not to serve any electricity or electric customers outside of the territorial limits of the State of Connecticut.

* * * * * * [709]

Q Did they tell you why they did not want to be accessory to the fact of your resale of electric energy to a customer who took it outside of the State? *A* Yes, but I did not understand the answer clearly.

Q What was the answer, so far as you recall it. *A* Well, it was that they did not desire to be under the ruling of the SEC.

* * * * * *

Q The Borough is no longer selling electric energy to Fishers Island, is that true? *A* That is true. They are no longer selling it.

Q When did the Borough make its last delivery of electric energy to Fishers Island? *A* In February, 1940.

Q Was it on February 8th, 1940? *A* Actually, the physical disconnection was February 28th, the physical disconnection.

[710] *Q* On February 28th, the facilities were physically disconnected, so that thereafter the Borough could no longer deliver electric energy to Fishers Island? *A* Yes.

Q Had the Borough delivered electric energy to Fishers Island up to that date? *A* Yes—with qualification. We had designed connections so that they could in testing the operation of the equipment, give immediate power.

Q You were connected so that you could supply them with electric energy. Was any electric energy actually supplied them after February 8th or 9th? *A* I am sure there was not.

Q You have been saying February of 1940. Was it this year or last year? *A* This year.

Q It was 1941 instead of 1940? *A* Yes.

Q For clarity then, the Borough actually delivered quantities

of electric energy to Fishers Island up to February 8th or 9th, 1941 and remained connected up to February 28th, 1941? *A* Yes.

Q After you disconnected from Fishers Island and ceased to serve them with electric energy, did the Company [*711*] negotiate or enter into an agreement with the Borough to supply them with electric energy? *A* Not a new agreement.

Q No new agreement? *A* No new agreement.

Q You are now paying for electric energy on the terms outlined in the letter of June 14th, 1940, are you? *A* Yes, sir.

Q But you have no contract binding them to deliver the electric energy to you? *A* Nothing, except as mentioned in the letter.

* * * * * * [*712*]

Q What has been the effect on your ability to negotiate contracts for the sale of electric energy in not having a contract with the Connecticut Light and Power Company? *A* We have been unable to sell prospective customers.

Q You have been unable to sell to prospective customers? *A* Yes.

Q Was the purchase of the 33,000 volt line from the Connecticut Light and Power Company by the Borough, and I refer to the line between the Trails Corner sub-station and the Groton Long Point high voltage sub-station—was that sale ratified by proper action of the Borough or by action of the Borough on September 3, 1940?

Trial Examiner: I think the question might be worded what ratification was made. I don't believe the witness is qualified to say what is proper.

Mr. Wahrenbrock: I meant to omit the word "proper", if your Honor please.

The Witness: May I please have the question again?

By Mr. Wahrenbrock: *Q* Yes. The question is whether that purchase was ratified by the adoption of an ordinance? *A* It was

ratified but not by adoption of an ordinance—yes, it was adopted by an ordinance.

Q On what date was that ordinance adopted? [*713*] *A* I have not that information.

Q Are you able to say whether it was on October 3, 1940? *A* About that time, yes.

Q About that time? *A* About that time.

Q Since the Borough of Groton has ceased to supply electric energy to Fishers Island, has any representative of the War Department approached you about the possibility of restoring electric service to the Island?

Mr. Branch: I object. It seems to me that is entirely immaterial. Conversations between third parties, I think, is going pretty far. There might be conversations in regard to any of these matters with the respondent which might be material, but conversations between this witness and the representative of the War Department, it seems to me is inadmissible as being hearsay and as being irrelevant, and having no bearing on the issues of the case.

Trial Examiner: We are ruling out hearsay. Can counsel state any reason why the hearsay rule should be waived?

Mr. Wahrenbrock: Mr. Examiner, I think it is just a matter of common observation. We know in these times that when the War Department wants to get something done and is faced with a difficult situation, it goes to a man and talks to him and hopes to get results. I propose to ask this witness, rather than bring an army officer here to testify. He has [*714*] more important things to do. This man participated in the conversation, if there was a conversation, and I am asking if there was.

Trial Examiner: I think in view of the circumstances, and the normal objection at the present time to subpoenaing an army officer away from his other duties, we will permit the question to be answered.

By Mr. Wahrenbrock: *Q* Will you answer the question now,

Mr. Tiffany? *A* I can't answer the question correctly as to date, but there was the colonel of the army, and a gentleman with him from the army district in Boston, in my office asking the Borough of Groton to supply more power to Fishers Island.

Q In asking you for a description of the facilities of the Borough yesterday, I believe I omitted to ask you to state how the Groton Long Point high voltage sub-station was connected to the Groton Long Point brick sub-station.

* * * * * * [*715*]

A There was a 6900 volt line from the sub-station, about half way between there and the brick sub-station. The remaining half was under ground cables, and there was also a duplicate line, all overhead, but it was never put in use from and to the station. It was an emergency line.

Q What was the voltage at which that line and underground cable was operated? *A* Between 6600 and 6900 volts.

* * * * * *

Cross Examination by Mr. BRANCH.

Q Mr. Tiffany, I would like to ask you a question. The [*716*] cable or—in the first place, of course, all of these facilities which you have described, with the exception of the cable, are in the State of Connecticut, are they not, Mr. Tiffany? *A* Yes.

Q And the cables always belong to a company which served customers on Fishers Island with electricity, did they not? *A* Yes.

* * * * * * [*719*]

By Mr. Branch: *Q* Now, the cables, as I understand it, were attached to your facilities at a point right on the shore, approximately in the place which I indicate here, were they not, Mr. Tiffany? (Indicating.) *A* They were approximately 400 feet back of this point here (indicating) in a little building right there (indicating on map).

Q But it is very near the shore? *A* Yes.

Q You call that the Brick Substation? *A* Yes.

Q Now, that substation was at all times owned by the Borough of Groton, was it not? *A* Yes.

Q And in that substation were also connections of yours which served customers in Groton on the mainland, were there not? *A* Yes.

Mr. Wahrenbrock: Mr. Examiner, respondent's counsel is pointing to a location in Groton Long Point rather than Groton, as I know the topography, but I may be mistaken.

[*720*] Mr. Branch: I don't know where the boundary lines are between the Boroughs, and I am not concerned about it, when I am speaking of Groton, because I am talking about the town of Groton now. It was—there is a town of Groton which is shown as such, on this map, isn't there?

The Witness: I answered that, that it was the town of Groton.

By Mr. Branch: *Q* And then, as I understand it, there ran from that substation a line to another substation which you called the Groton Long Point Substation? *A* That is right.

Q And that line operated at about 6,600 volts? *A* Yes.

Q And that line at all times was owned by the Borough of Groton, was it not? *A* Not at all times—pardon me, yes.

Q That line was how long,—about a mile? *A* Roughly a mile.

Q And I think you said that part of that line was carried overhead on poles and part was a cable underground, is that correct? *A* Yes, sir.

Q We are now at what I call the Groton Long Point substation, at the point indicated here (indicating on map) and [*721*] that substation, I think you said, transformed the energy from 33,000 volts to 6,600 volts?

Mr. Wahrenbrock: Mr. Examiner, there was no statement on the direct examination that the transformers transformed the energy. There may have been a change in the voltage—there

may have been testimony about a change in voltage by the transformers. There was no testimony as to a change in the energy by the transformers.

Mr. Branch: I am cross examining the witness and I think I have a right to ask him that question.

Mr. Wahrenbock: You assumed a statement that had not been made.

By Mr. Branch: *Q* Well, is it not true that at that point there were transformers which transformed the energy from 33,000 volts to 6,600 volts, Mr. Tiffany? *A* Yes.

Q There were several transformers there, were there not? *A* Three.

Q And those transformers were owned by the Borough of Groton, from some time in 1935, up to the present year, were they not? *A*. Yes, sir.

Q And all of the other equipment in that substation was owned by the Borough of Groton during those times, was it not? [*722*] *A* The Groton Long Point Substation, the high voltage substation?

Q Yes. *A* May I have that question again, please?

Mr. Wahrenbock: I am sorry, I did not hear the answer.

The Witness: I did not answer. I asked for the question again.

(The question is repeated.)

By Mr. Branch: *Q* That is, from 1935 up to the present year. *A* All but a portion of it.

Q What portion of it was not? *A* Just the lightning arresters.

Q The lightning arrester? *A* Arresters,—three.

Q Then going in this direction, which I take it is in a general northwesterly and a westerly direction (indicating) there was a double circuit line of 33,000 volts to Trails Corner, was there not? *A* Yes.

Q And that line, or those lines, were owned by the Borough

of Groton from some time last Summer, that is, 1940, up to this year, were they not? *A* Yes, some time in 1940.

Q And that line was a 33,000 volt—both of those cir- [723] cuits were 33,000 volts, were they not? *A* Yes.

Q Now, as I understand it, at Trails Corner there was a sub-station which was at all times owned by the Borough of Groton? *A* No, the substation building was at all times owned by the Borough of Groton. The substation contents were finally acquired by the Borough of Groton.

Q When was that acquired? *A* During the past fourteen years.

Q During the past fourteen years? *A* At various times.

Q At various times? *A* Yes.

Q But for many years the Borough of Groton has owned a sub-station there with all of its contents, has it not? *A* No. I think we have owned all of them for—if I look at these papers, I think I can give you the date.

* * * * * * [731]

By Mr. Branch: *Q* Now, Mr. Tiffany, the Borough of Groton has operated the facilities which it has owned from time to time, has it not? *A* Yes.

Q And coming now to the Trails Corner sub-station, there was a line, and is a line, which goes through the Borough sub-station and then serves numerous customers, is there not? *A* We have no sub-station at Trails Corner.

Q The Borough has no sub-station? *A* No sub-station. A secondary sub-station. We do have a distribution sub-station.

Q Well, that is what I referred to? *A* Yes.

Q But the lines that went down to Groton Long Point didn't go through that sub-station, did they? *A* Yes, went through—what particular sub-station are you asking about?

Q There was a 33,000 volt double circuit line from Trails Corner directly down to the Groton Long Point sub-station, was there not? [732] *A* Yes.

Q And then at Trails Corner, there were also lines that ran through the Borough's distribution sub-station? *A* Yes.

Q And those lines were not connected with Fishers Island at any time, were they? *A* No.

Q Now, I call your attention to the provisions in the contract of March 31, 1930, between the Connecticut Light and Power Company and the Borough of Groton, and show you this provision:

> "The power company shall deliver the electric energy herein contemplated at its sub-station located near Trails Corner in the Town of Groton, at Groton Long Point, in the Town of Groton, and at such other points as may be mutually agreed upon."

Then also, on the next page:

> "The delivery points shall be the low tension terminals of the transformers now installed, or other transformers in substitution therefor, at the above-mentioned sub-station of the Power Company at Trails Corner in the Town of Groton, the end of existing 33,000 volt transmission line at Groton Long Point, and such other points as may be mutually agreed upon."

Trial Examiner: State what page of the contract that is [733] on.

Mr. Branch: The first abstract is on page 1, and the second is on page 2 of the copy as I have it here.

Trial Examiner: Is that a copy of the agreement as attached to the stipulation?

Mr. Branch: Yes, I think so. I am not sure the pagination is precisely the same, but I suppose so. I think the pagination is the same.

[734] By Mr. Branch: *Q* At that time those were the delivery points, were they not?

Mr. Wahrenbrock: Excuse me. At what time, please?

Mr. Branch: When this contract first went into effect.

Mr. Wahrenbrock: Mr. Examiner, we have not gone back of 1935, so far, on the direct examination.

Trial Examiner: I think in the direct examination the examination was confined to the time since August, 1935.

Mr. Branch: All right. I don't care about going any further back than that.

By Mr. Branch: *Q* Now, I wish to show you the letter from the Connecticut Light & Power Company to the Borough of Groton of June, 1940—

Mr. Wahrenbrock: Could you give that date more definitely?

Mr. Branch: I think it is June 14th, 1940.

Mr. Wahrenbrock: Are you referring to the letter which is attached to the Stipulation?

Mr. Branch: I think so. The only trouble is that these are such a large bunch that I find it very difficult to locate anything. Yes, it is the letter of June 14th, 1940.

By Mr. Branch: *Q* I show you this and ask you what it is.

Mr. Wahrenbrock: Mr. Examiner, the word "this" that the [735] respondent has used, will be ambiguous in the record. May it not appear that the reference is to the letter which is identifiable?

By Mr. Branch: *Q* I refer you to a letter—there was a letter which has been referred to by you, Mr. Tiffany, I think, as the letter of June 14th, 1940. *A* Yes.

Trial Examiner: May I ask one question to clarify this point? Was this the only letter of June 14th, 1940?

The Witness: I think there was another letter of June 14th, 1940.

Mr. Wahrenbrock: In that case, Mr. Examiner, I object to reference to a letter—an unidentified and an unproven document. May we have the reference to something that is identified and proved?

Trial Examiner: I think in view of the statement of the wit-

ness that there are two letters of that date, it might be well to refer to it as the document appearing in the stipulation.

Mr. Branch: I would, but those documents have not yet been admitted.

Mr. Wahrenbrock: I will be glad to assist you by giving you my copy of the attachments to the stipulation.

Mr. Branch: Thank you.

[736] By Mr. Branch: *Q* Will you look at the copy of the letter of June 14th, 1940 which Mr. Wahrenbrock has just handed to me, as a copy of a letter attached to the stipulation, on the letterhead of the Connecticut Light and Power Company, addressed to you. Does that contain the following:

> "Service to be delivered and metered at the 33,000 volt terminals of the Company's transmission line at the Borough's Trails Corner Substation, the Borough to furnish and maintain all receiving, transforming protecting, regulating and distributing facilities required to receive and utilize the service."

A Yes.

Mr. Wahrenbrock: May I have the first part of the question read? It is so long that I lost it.

Trial Examiner: The reporter will read the question back for the benefit of Commission Counsel.

(The question is repeated.)

By Mr. Branch: *Q* And has that been the arrangement for servicing and metering for some time? *A* No.

Mr. Wahrenbrock: Mr. Examiner, I object to "for some time".

Trial Examiner: I think definite dates should be set.

[737] By Mr. Branch: *Q* And how long has it been the arrangement?

Mr. Wahrenbrock: May the answer which came so quickly that I did not have an opportunity to insert my objection be stricken, and may the question be reframed and properly?

Trial Examiner: It will be so stricken.

Mr. Branch: I thought I did reframe it.

Trial Examiner: He had already answered it, however.

By Mr. Branch: For how long has that arrangement in regard to servicing and metering been in effect? *A* It is not in effect and has not been in effect.

Q It is not in effect? *A* No.

Q Where is the metering done at the present time? *A* The metering is done at the present time by the Borough of Groton's electrical department's meters on the secondary side of the transformers.

Q And how long has it been done there? *A* For about two and a half months.

Q And before that, where was it done?

Mr. Wahrenbrock: Mr. Examiner, may the question be made more definite as to what period of time?

Trial Examiner: I think that question can follow this one.

The Witness: The metering prior to the period which I just [738] said, two and a half months, was done at the high voltage terminals of the Trails Corner Substation.

By Mr. Branch: *Q* Was that the point of delivery and the point of metering from the time of 1935 on? *A* Yes, sir.

Mr. Wahrenbrock: Mr. Examiner, may the question be separated into its two parts and put independently?

Mr. Branch: He has answered it and said "Yes".

Trial Examiner: I think he said the point of delivery and the point of metering. Do you want to separate that?

Mr. Branch: They were the same, I understand.

Trial Examiner: Will you read the question, so that counsel may hear it?

(The question is read.)

Mr. Wahrenbrock: I move that the answer be stricken and the question divided.

Trial Examiner: What division does counsel desire?

Mr. Wahrenbrock: To ask a response as to the point of delivery and a separate response as to the point of metering.

Trial Examiner: I think that can be clarified by asking if the point of delivery and the point of metering were the same.

By Mr. Branch: *Q* From 1935 until the last few weeks, the point of de- [739] livery and the point of metering were the same, were they not, Mr. Tiffany? *A* Within a very few feet.

Q At the point you have indicated? *A* At the point I have indicated.

Q On the high tension side of the transformers at Trails Corner? *A* Yes.

Q Now, Mr. Tiffany, I want to go into the situation as it exists at the present time. Have you any contract with Fishers Island Farms, Incorporated or any other organization, to supply electric energy to Fishers Island at the present time? *A* No.

Mr. Wahrenbrock: Mr. Examiner, I object to that question. It does not appear that there is a Fishers Island Farms, Incorporated, at the present time.

Mr. Branch: I said "any other company serving Fishers Island".

Trial Examiner: The question may be answered.

The Witness: No.

By Mr. Branch: *Q* You did have a contract, did you not, with Fishers Island Farms, Incorporated?

Mr. Wahrenbrock: Mr. Examiner, may it be made specific, as to the time?

[740] Mr. Branch: I think I have got to ask my questions one at a time.

Trial Examiner: I think counsel may ask the question and then if the answer is not clear or involves an answer to more than one question, a motion to strike will be in order.

By Mr. Branch: *Q* Until some time in May or June, 1940, did you have a contract with Fishers Island Farms, Incorporated? *A* Yes, sir.

Q And was that contract cancelled by your Board of Utilities Commissioners, by formal action? *A* Yes.

Q And have you any contract with anyone for supplying electric energy to Fishers Island at the present time? *A* No.

Q You ceased furnishing any electric energy to Fishers Island on February 9th, 1941? *A* To the best of my belief.

Q I show you what purports to be a certificate by you in regards to the cancellation of that contract and ask you whether that is a correct copy of the vote of the Groton Utilities Commissioners.

Mr. Wahrenbrock: May the document referred to be identified, so that it will be clear on the record just what is being referred to?

[*741*] Trial Examiner: I understand counsel proposes to offer this as an exhibit?

Mr. Branch: Yes.

Trial Examiner: If so, I think the preliminary question is sufficient identification.

[*742*] By Mr. Branch: *Q* Will you answer the question? *A* Yes.

Mr. Branch: I ask that the document I have just mentioned be marked Exhibit No. 20 for identification.

Trial Examiner: It may be so marked.

(The document referred to was marked as Exhibit No. 20 for Identification.)

Trial Examiner: May I have a copy of that.

(Copy handed to Trial Examiner.)

Mr. Branch: I offer in evidence Exhibit No. 20 for Identification.

Mr. Wahrenbrock: No objection.

Trial Examiner: Exhibit No. 20 will be received in evidence.

(Exhibit 20 for Identification received in evidence as Exhibit 20.)

By Mr. Branch: *Q* Mr. Tiffany, has the Borough of Groton supplied any electric energy to Fishers Island since February 8, 1941? *A* The charging current of the cable to Fishers Island, which we connected until February 28, 1941, was billed to Fishers Island.

Q And did you exchange letters with Fishers Island Electric Corporation in regard to that matter in February, [*743*] 1941. *A* Yes. February 28th.

Q I show you what purports to be a copy of a letter from Fishers Island Electric Corporation to the Borough of Groton, dated February 27, 1941, and also what purports to be a letter from the Borough of Groton Utility to the president of Fishers Island Electric Corporation, dated February 8, 1941, and ask you whether those are copies of letters which were sent and received at about that time? *A* Yes.

Mr. Branch: I ask that the letter of February 27, 1941, to which I have just referred, be marked Exhibit No. 21 for Identification, and that the letter of February 28, 1941 to which I have just referred be marked Exhibit No. 22 for Identification.

Trial Examiner: The reporter will so mark them.

(The documents referred to were marked as Exhibits Nos. 21 and 22 for Identification.)

Mr. Branch: I now offer in evidence Exhibits Nos. 21 and 22 for Identification.

Trial Examiner: Is there any objection?

Mr. Wahrenbrock: No objection.

Trial Examiner: Without objections, Exhibits 21 and 22 will be admitted.

(Exhibits 21 and 22 for Identification received in evidence [744] as Exhibits 21 and 22.)

By Mr. Branch: *Q* Mr. Tiffany, I call your attention to a sentence in this letter which is now Exhibit No. 21, the letter from the Fishers Island Electric Corporation to the Borough of Groton which says, "After midnight on February 28, 1941"—I will read the first paragraph:

> "Acting on your official notification and request (voted by your Board of Utility Commissioners) as set forth in your letters to Fishers Island Farms, Inc., dated June 4, 1940, this corporation as assignee of Fishers Island Farms, Inc. proceeded promptly to construct its own source of power on Fishers Island. This construction work was substantially completed on February 9, 1941 and accordingly, no electric

energy has been purchased or received from you since February 8, 1941. After midnight on February 28, 1941, it will be unnecessary for you to supply us with any electric energy and you can sever connection with our cable."

A Yes.

Q The letter contained that paragraph, did it not? *A* Yes.

Q Since that time, have you had a contract with the Fishers Island Electric Corporation, or anybody else, for supplying electric energy to Fishers Island? *A* No.

[745] *Q* Now, after the receipt of the letter of February 28, 1941, from which I have read an abstract—or February 27, 1941—did you sever connections with the Fishers Island cable? *A* Yes.

Q Am I correct in my understanding that on February 9, 1941, switches at the Fishers Island end of the cable on the mainland were open? *A* No.

Q You don't know about that? *A* No, they were not.

Q They were not? *A* They were not opened then.

Q When were they opened? *A* February 28th.

Q I am saying Fishers Island, Mr. Tiffany. *A* Yes, I realize you did.

Q Well, your understanding is that the switches at Fishers Island were not opened then? *A* When is that?

Q February 9th. *A* They were not opened then.

Q Well, did not this letter to you say that they had been receiving no energy since that time? *A* They said so, but they received energy since that time. Since then they telephoned me, and we made arrangements until [746] March 1st.

Q You say their letter to you is in error in saying that they received no energy since February 8, 1941? *A* Upon receipt of the letter I asked them if they wanted to be actually disconnected, or if they wanted to still have standby power there, and he answered in the affirmative.

Q You mean that merely the cable was energized? *A* Yes.

Q You didn't actually deliver any electric energy that you charged for after February 9th? *A* Yes, the energy used for energizing the cable.

Q Just for energizing? *A* Well, I don't know whether there was any more or not, but that much was there surely.

Q Well, regardless of that, did you—and when I say you, I of course, mean the people under you at your direction—open the switches at the sub-station on the shore at Groton which supplied the Fishers Island cable on March 1, 1941? *A* Yes.

Q And did you then also remove the conductors between those switches and the cable pot heads? *A* Yes.

Q And in the first few days of March, did you also start taking down the double circuit 33,000 volt line near the Trails Corners sub-station? [747] *A* We started to take down one of the double circuit lines.

Q And did you also disconnect the line running into the sub-station a mile from the shore, which connected the line formerly running out of the sub-station? *A* Yes.

Q Now, by March do you recall that there was a certain party that went with you around and looked at the facilities, on or about March 21st of this year?

Mr. Wahrenbrock: Mr. Examiner—

Trial Examiner: I think the question is a little vague.

By Mr. Branch: *Q* Did you make an inspection of some of the facilities about the 21st of March, Mr. Tiffany—of your facilities? *A* I inspected the facilities very often, but could not say the date.

Q Well, as I understand it, you started in March to dismantle and remove the entire line from Trails Corners to Groton Long Point sub-station, did you not? *A* No.

[748] *Q* Well, now, will you explain what has been done? *A* After the discontinuance of the 33,000 volt circuit, we used one of these circuits to supply the Groton Long Point at 2,300 volts. The part which was unused we did start to dismantle, but we are still using part of that line for 2,300 volt distribution.

Q The line starts right at Trails Corner, does it not? *A* And is it not true that for a considerable distance, both circuits from Trails Corners, both lines, have been removed? *A* What date?

Q They have now been removed? *A* Yes.

Q So that as you stand at Trails Corner and look down, you can see none of either of the circuits which go down to Groton Long Point. That is correct, is it not? *A*. That is correct.

Q And about what was the distance from Trails Corner Substation to Groton Long Point Substation? I mean the 33,000 volt line.

Mr. Wahrenbock: Mr. Examiner, I don't believe the question is clear.

Mr. Branch: If it is not, I will reframe it.

By Mr. Branch: *Q* What was the approximate length of the distance of the double circuit 33,000 volt line from Trails Corner to the [749] Groton Long Point Substation? *A* Maybe five and a half miles.

Q And how much of those two double circuits, 33,000 volt lines, between Trails Corner and Groton Long Point substation are left now?

Mr. Wahrenbrock: Mr. Examiner, the witness has just said that there is not any 33,000 volt line now there at all.

Trial Examiner: No, the witness did not say that. He said he could not see any from the Trails Corner Substation now.

Mr. Wahrenbrock: Previous to that he said what was there was operated at 2,300.

Mr. Branch: I will clear this up if there is any doubt.

By Mr. Branch: *Q* It is true, is it not, that you are not operating any 33,000 volt line between Trails Corner Substation and Groton Long Point Substation? *A* Yes.

Q And it is true, is it not, that for a considerable distance south of Trails Corner, all of the lines and poles which were formerly used there have been taken away? *A* Yes.

Q And it is true, is it not, that all of one of those lines, all

the way from Trails Corner Substation to Groton Long Point Substation has been entirely removed?

[*750*] Mr. Wahrenbrock: Mr. Examiner, there has been no testimony about more than one line. There is testimony about two circuits, but there is no testimony about two lines.

Mr. Branch: I will change it to "circuits", then.

The Witness: May I please have the question again?

(The question is repeated.)

The Witness: No.

By Mr. Branch: *Q* What is left between those two points now? *A* Everything except the wire. The cross arms and the poles are left.

Q Haven't some poles and some cross arms been removed that were supporting this double circuit 33,000 volt line between Trails Corner Substation and Groton Long Point Substation? *A* Yes.

Q And will you tell us now what there is left in the way of equipment that did constitute or support those two circuits, between Trails Corner and Groton Long Point Substation? *A* That part of the former lines which were formerly 33,000 volts is now used for distribution by Groton Long Point at 2,300 volts. Approximately half of the line.

Q That is just one of the circuits? *A* One of the circuits.

[*751*] *Q* And is it true that all of one circuit has been removed and at least half of the other circuit? *A* All of the wires.

Q Yes. My statement is correct, is it not? *A* You said all of the circuit has been removed?

Q All of the wire on one of those circuits from Trails Corner Substation to Groton Long Point Substation has been removed, has it not? *A* Yes.

Q And for about half of the distance the wire has been removed on the other circuit, has it not? *A* Yes.

Q And some of the poles and cross-arms have been removed, have they not? *A* Yes.

Q How much of that has been removed? *A* Approximately half of the total.

Q That is for both circuits? *A* Both circuits.

Q So it is true, is it not, that for a distance of some two miles going south or east, if that is the direction in which the line went from Trails Corner to Groton Long Point Substation, everything that was there has been removed? *A* Yes, sir.

Q Now, coming to Groton Long Point Substation—

[752] Mr. Wahrenbrock: (Interrupting). Mr. Examiner, may the question specify which of the two substations in Groton Long Point?

By Mr. Branch: *Q* By the Groton Long Point Substation I mean the one in which there were transformers which changed the energy from 33,000 to 6600 volts. The one that is about a mile from the shore. Now, in that substation there were transformers, were there not? *A* Yes.

Q And have those transformers all been removed. *A* Yes.

Q And was there other equipment in that substation? *A* Yes.

Q And has that all been removed? *A* Not to my personal knowledge, but I believe it has been removed.

Q But substantially that substation has been dismantled, so that it cannot be used, has it not? *A* Yes.

Q And it is true, is it not, that you would have to replace transformers and reequip that substation if you were to have the service that you did have, or anything approximating it, going to Fishers Island? *A* You made your question too broad; I will have to answer [753] "No".

Q What is there left in that station? *A* Poles and structures.

Q But there are no transformers there? *A* No.

Q Are there any circuits, or conductors which are connected and in operation, going through that station? *A* No.

* * * * * * [754]

By Mr. Branch: *Q* Now, going south from that substation to the little substation which was on the shore to about a mile south of the substation that we have just been talking about is a small station very near the shore, is there not, Mr. Tiffany? *A* Yes.

Q As I understand it, you pulled the jumpers at that substation on March 1st, is that right? *A* Yes.

Q Will you explain what pulling the jumpers means? *A* I don't recall that specific title, but it was meant that the potheads were disconnected from the oil switches by the short wires commonly called jumpers.

Q And the conductors which led the cable have actually been cut off, have they not? *A* Yes.

Q So that there is no connection, or even an open switch by which they could be connected at that point? [755] *A* That is as of March 1st. There is nothing left, not even switches, buffers or anything else pertaining to the cables to Fishers Island.

Q It was all taken out in March? *A* Beginning March 1st or 2nd.

Q And did you also actually cut both of the 33,000 volt circuits at Trails Corner on March 1st? *A* No.

Q What was done in regard to cutting those lines on those circuits at Trails Corner? *A* We cut one 33,000 volt circuit and used the other circuit as 2300 volts for continuity of service to Bradmore Point.

Q Both of those lines have now been cut? *A* Yes. May I qualify the answer, please?

Q Were you talking to me? *A* Yes. May I qualify that answer?

Q Certainly. *A* They were both disconnected at Trails Corner substation near the first of March.

* * * * * * [757]

By Mr. Branch: *Q* The Borough of Groton, of course, had a large number of other customers besides Fishers Island Farms, Incorporated, had it not, for electric energy? *A* We had—the general customers, you mean?

Q Yes. *A* Yes.

Q I mean, most of the electric energy which you distributed was distributed and used by customers in the Town of Groton, in Connecticut, was it not? *A* At nearly all times, yes.

* * * * * * [758]

By Mr. Branch: *Q* Using this as a basis for your answers, Mr. Tiffany, will you tell us during the last four months of 1935, what the sales by the Borough of Groton to Fishers Island Farms, Inc. was? *A* 500,400.

Q Kilowatt hours? *A* Yes.

Q And the figures that you give hereafter are all kilowatt hours? *A* Yes.

Q And for the year 1936. [759] *A* 1,348,200 kilowatt hours.

Q And for the year 1937. *A* 1,454,400, kilowatt hours.

Q And for the year 1938. *A* 1,429,150, kilowatt hours.

Q And for the year 1939. *A* 1,435,600 kilowatt hours.

Q And for the year 1940. *A* 1,504,800 kilowatt hours.

Q And for the year 1941 to date. *A* I have no records to date.

Q Well, this is for the first two months here, is it not? *A* Yes.

Q And you haven't supplied anything since the end of February? *A* No.

Q So the two months' figure would be for the entire time up to date? *A* Yes. 215,280 kilowatt hours.

* * * * * * [760]

Q Mr. Tiffany, I show you what purports to be a copy of a letter from you to Mr. Lindsley, vice-president of the Connecticut Light and Power Company, dated October 30, 1940, and attached to it what purports to be a copy of a letter from A. V. S. Lindsley, vice-president, to you, dated October 23rd, 1940, and I ask you whether those are copies of letters which were sent and received at or about the times mentioned?

Mr. Wahrenbrock: Mr. Examiner, I object to that question, because no basis has been laid for assuming that the witness knows anything about the receipt of the letter of October 30th, 1940.

By Mr. Branch: *Q* Did you mail the letter, Mr. Tiffany, on or

about October 30th, 1940, in the United States Mails, addressed to Mr. Lindsley, of which that is a copy? *A* Personally?

Q Did you give it to someone on your staff to mail? *A* Yes.

Q And as far as you know, was it mailed? *A* It was.

Q Did you receive a letter of which the other document dated October 23rd, 1940 is a copy? *A* Yes.

Mr. Branch: I ask that the first of these in point of [*761*] date, that is, that of October 23rd, 1940, be marked Exhibit 23 for Identification, and the one dated October 30th, 1940 be marked Exhibit 24 for Identification.

Trial Examiner: They will be so marked.

(Letter referred to was marked Exhibit Number 23 for Identification.)

(Letter referred to was marked Exhibit Number 24 for Identification.)

Mr. Branch: I offer in evidence Exhibits 23 and 24 for Identification.

Mr. Wahrenbrock: No objection.

Trial Examiner: Without objection the documents marked Exhibits 23 and 24 for Identification will be admitted in evidence.

(Exhibits Numbers 23 and 24 for Identification are marked Exhibits Numbers 23 and 24 in Evidence.)

* * * * * * [*763*]

EMIL J. AMBERG,

a witness produced on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Mr. Amberg, what is your address? *A* Waterbury—my home address?

Q Yes. *A* 53 Euclid Avenue, Waterbury, Connecticut.

Q What is your position with the Connecticut Light and Power Company? *A* Research engineer.

Q Will you explain the duties of the research engineer in the

respondent corporation? *A* General studies in connection with system loads, and future planning, studies in—economic studies of cost, power cost for electric service, gas service, and many special problems that are put up to me. There are no routine duties connected with my job. One of the things that is under my direction at the present time is the preparation of reports of all kinds.

Q Including reports to regulatory agencies? [764] *A* Yes.

Q Does that complete your general statement of the duties of that position? *A* Yes, because the other work I do can't be specified specifically like that. Miscellaneous jobs that come up, of you might say, a consultant nature to various departments of the company.

Q You are the head of a unit in the organization of the company, are you? *A* Yes.

Q How large is that unit? *A* Well, there are six people besides myself.

Q What type of training do those people have? *A* Well, one is an engineer, two of them are statisticians, clerical work, statistical work. There are two girls, clerks, and one girl who is a mathematician for the principal in the high school before she was employed by the company.

Q What is the nature of your own training? *A* I went to the Federated Polytechnic in Zurich, which is comparable to M.I.T. in the United States. I took courses in mechanics and electrical engineering, majored in mechanical engineering and obtained a degree in mechanical engineering. I also took some special courses after I graduated in power plant design, railroad electrification, structural steel, reinforced concrete.

[765] *Q* How long have you been with the Connecticut Light and Power Company? *A* Since 1916.

Q In what capacities have you been associated with the company since that time? *A* The previous title was electrical engineer, and in that I had principal charge of the design work, and also during the last war the supervision of the operation of power plants and transmission lines.

Q Do you conduct studies and make reports when the development of the company's load gives rise to need for change or expansion of plants? *A* I do.

Q Do you study maintenance problems? *A* No.

Q You have no responsibility in connection with maintenance? *A* No, sir.

Q Do you conduct any experimental research? *A* No, sir.

Q Do you study questions of capacities which should be provided? *A* I don't quite get the significance of the question.

Q Do you advise upon the capacities of generating and transmission equipment which should be installed? [766] *A* In a preliminary way, yes.

Q Do you conduct studies with respect to the replacement of facilities? *A* Well, incidental to providing additional capacity, yes.

Q I believe you stated that you made studies of load growth? *A* Yes, sir.

Q Will you explain a little bit more about the nature of such studies? *A* Well, we make forecasts to determine the trend so that we have basic data over a long enough period so that we can make preparations for additional facility capacity, principally, at an early enough date, by checking all the facts that are available to us, and also keep currently track of whatever information we can get of changes that take place, particularly data for manufacturers as to their plants.

Q How long a period of time do those forecasts cover, as a matter of practice? *A* Well, we consider five years. Of course, we extend beyond five, but if you extend beyond five years, even five years it is a period that is very often somewhat difficult to be very sure. That is why we refer to most of our forecasts as normal.

[767] *Q* Forecasts for that period of time are in practice used by the Company in planning its capital investment and expansion of its plant, are they? *A* Yes.

Q Would such forecasts include consideration of the question

of the need of increasing the capacity of substations and transmission lines? *A* Transmission lines are included, but not substations.

Q Will you explain why substations are not included? *A* Well, the operating department usually follows that from their local data.

Q But your forecasts do take into account the need for new plant construction of other nature? *A* Yes.

Q In general, you do the work of planning for the future for the Company? *A* Yes.

Q And when you have conducted a study, do you make a report, embodying your conclusions, and setting forth your reasons for the conclusions? *A* Yes. Sometimes it is just in letter form.

Q To whom do you report? Who is your superior in the organization of the Company. *A* Mr. R. H. Knowlton, Executive Vice President.

Q Does the Company make available to you for the purposes [768] of the work that you have to do, the data and material which is available in the organization for those purposes? *A* Yes, sir.

Q Do you do the work with respect to the design of new equipment? *A* No.

Q With respect to the remodeling of equipment? *A* No, sir.

Q And with respect to the replacement of equipment? *A* No, sir.

Q Your research is not limited, I take it from what you have said, to the purely electric engineering aspects of problems, but takes into account their economic aspects? *A* That is right.

Q You consider the questions of the most economical mode of operating and building plant that is required? *A* Well, in the initial study we make comparisons as to which, in our opinion, is the most economical type of equipment to add to the system. When it comes to the economical operation, the every day operation, I have no duties in connection with that.

Q But in planning future development, you would take into account the economy of operation of various types of planned equipment? *A* We do.

[769] *Q* Do you also have to consider the economy of various sources of electric energy? *A* (No response.)

Q Do you study the costs of producing electric energy? *A* In different ways?

Q Yes. *A* Yes, we do. I do include different methods.

Q By "different methods" do you mean a comparison of purchase as against generation by the Company under particular circumstances? *A* No, I would not consider purchase, because I would have no data on which to base purchase cost.

Q Where the company has contracts for the purchase of electric energy, you would have data available which you could consider? *A* Yes, where we have contracts.

Q Have you conducted studies to determine the relative economy of generation of energy by the Company itself in lieu of purchase of energy, under such circumstances? *A* We have in isolated cases made checks.

Q Your research also covers questions of the sufficiency of reserve generating capacity? *A* That is an integral part of any study.

Q In such studies, are individual studies made with respect to each division or district of the Company, or is [770] some average load growth factor used in estimating growth load? *A* Our studies are for the Company as a unit.

Q In making such studies, do you use a single load growth factor for the entire Company, or do you use different load growth factors for different-- *A* (Interrupting) We use different load growth factors.

Q (Continuing) —for different divisions of the Company. *A* Yes, for different parts of the Company.

Q Are you familiar in a general way with the Company's purchases of electric energy from the Torrington Electric Light Com-

pany at Torrington and its sale of electric energy to the same company there? *A* Very generally, because it is not my duty to be specifically familiar with it.

Q Have you made any study in connection with that situation? *A* Several years back we made one analysis of cost as applying to our system, I believe.

Q Are you familiar with the change in the arrangement of facilities at Torrington, to which Mr. Campbell referred earlier in the course of this proceeding, as taking place within the last few months there? *A* I have not seen the new facilities.

[*771*] *Q* I did not ask you if you had seen them. I meant if you are familiar in a general way with what has been done there? *A* Yes, in a general way.

Q Do you know whether the Torrington Company is now purchasing any electric energy from the Connecticut Light & Power Company generated at the Robertsville Plant? *A* I don't know.

Q You don't know? *A* No.

Q Now, do you know whether that supply of electric energy from the Robertsville Plant to Torrington, where there is an excess, has been terminated or not? *A* I don't know.

Q In a situation like that which prevailed prior to the recent change at Torrington, where the Torrington Electric Light Company was selling electric energy to the Connecticut Light and Power Company and at times the Connecticut Light and Power Company was selling electric energy to the Torrington Company when it had excess energy from the Robertsville Plant, is it possible to determine the total amount of electric energy supplied in each direction over a circuit, for a period of time?

Mr. Branch: Excuse me, may I have that question read, please?

[*772*] Trial Examiner: Read the question for the benefit of respondent's counsel.

(The question is read.)

The Witness: There are meters which are read to indicate flow between readings, and these meters are used for billing—these meter readings are used for billing.

By Mr. Wahrenbrock: *Q* Is there more than one meter to measure flow in both directions? *A* I am not familiar with the meter arrangement. I don't know what meters are there for measuring.

Q There are meters available for measuring flow in one direction over such a circuit under those conditions? There are such meters designed? *A* There are meters that are used for that purpose.

Q What type of meter is that? How is it generally referred to? *A* A watt-hour meter is one meter. Then there are recording meters of various kinds.

Q Where it is desired to measure the flow of electric energy over a circuit in one direction and energy during a period of time flows in both directions over that circuit, will the ordinary watt-hour meter show you the total flow in one direction? *A* If there is one watt-hour meter connected?

[773] *Q* Yes. *A* Whether that watt-hour meter will show what? I am not quite clear on the question you asked.

Trial Examiner: The reporter will repeat the question.

(The question is repeated.)

The Witness: No.

[774] *Q* Is there a meter that will show you the flow in one direction? *A* A watt-hour meter with a ratchet.

Q And in order to obtain the total flow over that same circuit in the opposite direction during the same period, can a second ratchet meter be used to show the flow in that direction? *A* As I understand it, yes.

Q Then the watt-hour meter with a ratchet does show the total amount of energy flowing in one direction over a circuit during a given period of time, although there may be energy flowing in both directions over that circuit during that period of time?

Mr. Branch: May I have that question?

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Branch: I don't quite understand the question. You mean

energy flowing in both directions at the same time, or at different times, during certain periods?

Mr. Wahrenbrock: During the total period of time energy flowing in both directions, flowing only in one direction at any given instance.

By Mr. Wahrenbrock: *Q* With that explanation, can you answer the original question, Mr. Amberg? [775] *A* The explanation you added there kind of confused me.

Trial Examiner: I think the explanation was for the benefit of counsel, not for the witness, primarily. Perhaps if you will reread the original question—

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: The generally accepted use of the meter is in that way.

Trial Examiner: Does that answer the question?

Mr. Wahrenbrock: I believe it does, Mr. Examiner.

By Mr. Wahrenbrock: *Q* Where there are two ratchet meters in a circuit, over which in the course of a given period of time electric energy flows in both directions, is it possible at any given instance to determine, by looking at the meters in which direction the energy is flowing? *A* I am not too familiar with construction of meters, to be sure of answering correctly.

Q Well, I didn't realize that there was a question of that nature involved. I assumed that when you had two such ratchet meters you could look at them, and it was a matter of common experience that one of them would be recording and the other one would not be, at any given instance, and by seeing which was recording you could tell which direction the energy was flowing in. Am I not correct in that? [776] *A* Well, you would have to observe the meter long enough so that you could notice a recording on one of the meters.

Q Yes. If you saw the disk on the meter, the aluminum disk that we all are familiar with, if it is aluminum, if you saw that revolving on one, you could tell which direction the energy was

flowing in if you knew the hook-up of the meter, couldn't you? *A* Yes.

* * * * * * [777]

Q . . . Have you ever made a study of the cost of supplying electric energy to the Winsted district? *A* I think I have made a rough study.

Q When was such a study made? *A* I do not recall. I would have to look it up.

Q Has it been made within the last six months?

Mr. Branch: By him, you mean?

Mr. Wahrenbrock: Thank you, Mr. Branch; yes, by you.

The Witness: I do not want to answer that question without checking my records. I am not sure.

By Mr. Wahrenbrock: *Q* Have you ever made a study, or has a study been made by any men under your supervision with respect to a proposed supply of electrical energy to Winsted by a new line from [778] Waterbury? *A* I have checked that myself.

Q You have studied— *A* At one time, but I do not know the exact date.

Q You have studied that yourself? *A* Yes, at one time.

[779] *Q* In making that study, did you consider as one of the factors, the cost of generating electric energy by the steam generators of the Torrington Electric Light Company? *A* No.

Q In making that study, did you take into account the cost of purchasing electric energy—

Mr. Branch: (Interrupting) I object.

Mr. Wahrenbrock: May I complete the question?

Mr. Branch: Pardon me.

By Mr. Wahrenbrock: *Q* (Continuing) From the Torrington Electric Light Company.

* * * * * *

Mr. Branch: I object. I must say that I am quite in the dark as to any materiality of any of the questions that have been asked Mr. Amberg. Now it would appear that we are going into details

of some cost-study. I cannot see how that has any possible bearing upon the question of whether the Federal Power Commission has jurisdiction over this utility or not. It cannot depend upon any such matters as are being inquired into. I think this whole examination—as I say, I have been in the dark,—I was thinking continually that something would develop which would show materiality, and it seems [*780*] to me we are now entering a subject which is very clearly immaterial, and I object to it for that reason.

* * * * * * [*785*]

Trial Examiner: It seems to me it may very well be material, and we will permit the evidence if that is the purpose of it. I will permit the question to continue, and counsel may have an exception and may later move to strike if it is not developed to be material.

Mr. Branch: And may it be stipulated at this time that I have an objection to all further questions along the line of studies in regard to this matter.

I might say that I noted in certain parts of this transcript that where I had made an objection, there was no statement that an exception was noted. I thought the Examiner had indicated that he expected to have the word "exception" put in wherever that occurred.

Trial Examiner: Yes, where it is possible for the reporter to determine. Sometimes it is difficult for the reporter to determine that fact.

Mr. Branch: I am perfectly satisfied as long as it is understood that the word objection also means that an exception is taken, or that where any ruling is given which is adverse to the party objecting or offering—that it is considered that an exception is taken.

Trial Examiner: It will be so understood that where an objection is overruled an exception is automatic.

* * * * * * [*786*]

A In so far as the cost of power from the Torrington Company

is concerned, the only thing I took into account was the contractual price existing at the time.

Q Did you take into account additional payments to be made to the Torrington Company for its out of pocket expenses in supplying the Connecticut Light and Power Company with electric energy generated by its own steam plant? *A* I have at no time made any study or any report of obtaining power from the Torrington Company steam plant.

Q In the study of comparative costs to the Connecticut Light and Power Company of electric energy purchased from the Torrington Company, and electric energy supplied from its own system at Waterbury, did you take into account the relative reliability of service from those two sources? *A* No, I did not.

Q Have you made any study of that question? *A* Personally, I have not.

Q Was any such study made? *A* I cannot be sure. However, I believe I have seen a statement referring to the interruptions at Winsted.

[787] *Q* You mean during the 1938 flood and hurricane? *A* I don't know.

* * * * * * [793]

Q From what sources is Bristol usually served? *A* I don't know.

Q You were associated with the Connecticut Light and [794] Power Company at the time it participated in the Connecticut Valley Power Exchange, were you not? *A* Yes, sir.

Q Did you never have to make any studies in connection with the operations of that Exchange? *A* That was all handled by the Operating Department, and I did not belong to the Operating Department.

Q You have never made any study or had any knowledge of the operations of that Exchange? *A* Very generally, only.

Q As a matter of fact, you know the principal sources of supply used in the operation of that Exchange, didn't you? *A* No. I know some of them.

Q You knew the principal sources of supply used in the operation of that Exchange at the time the Connecticut Light and Power Company was a member of it, didn't you? *A* I would not be sure that I knew about all of them.

Q You knew that at that time there was available for supply of electric energy requirements at Bristol energy which either came down from the Hartford-Agawam line or was generated at Hartford or was generated at Falls Village, or was received from the Central Hudson Gas and Electric Company, didn't you?

Mr. Branch: I object to that. There are about five questions in it, the "or", "or" and "or".

Mr. Wahrenbrock: It is all one single question.

[795] Mr. Branch: I object to it on the ground stated.

Trial Examiner: Is the witness able to answer the question as a whole?

The Witness: At the time our company was part of the Connecticut Valley Power Exchange, I had general knowledge that power came from various generating sources, including our own, in to Bristol.

By Mr. Wahrenbrock: *Q* What were some of those sources? *A* Connecticut Light and Power Company generating plants, Hartford Company generating plants, Connecticut Power Company generating plants and plants of the Western Massachusetts Company.

* * * * * * [796]

Q At that time you knew that in practice, the requirements for Bristol were supplied from one or more of those various sources, did you not?

* * * * * *

The Witness: Bristol obtained its power from the Connecticut Power Company's lines. That is all I have definite knowledge of. As to the particular source of power for Bristol, I don't know how to determine that.

* * * * * * [800]

Q Have you had occasion to study the effect of the maintenance

or failure to maintain a reasonable power factor on the economy of transmission line operation?

* * * * * *

A In studying transmission problems, we always take into account the power factor as one of the elements in the design [*801*] of the line.

Q Will you, for the benefit of those of us who are not technically trained, will you explain how the power factor affects the economical operation of a transmission line? *A* Low—what we call a low power factor absorbs or makes useless a part of the ability to transmit power. I don't know whether that will explain.

Q I think that is very helpful. If I understand it right, then, if a higher power factor is maintained, does it make the line more economical to operate?

* * * * * *

A Not necessarily. The expense to obtain a higher power factor may be excessive.

Q Then against the advantages obtained from the maintenance of a higher power factor in more economical operation of the transmission line, must be balanced the expense of obtaining that higher power factor, is that right? *A* Sure.

Q What is the effect of a low power factor on the maintenance of voltage of a transmission line? [*802*] *A* Transmitting a certain—I am trying to find out what the question is, the specific question, I am not clear.

Q For the purpose of the question, I will assume that the amount of power transmitted is unchanged. *A* The power factor will affect the amount of voltage drop in the line.

Q And how will it affect it? *A* The lower the power factor, the greater the drop—I believe to a certain point.

Q And what is the effect of a voltage drop in the operation of a transmission line? *A* It affects service.

Q And how does it affect service? *A* Low voltage.

Q That is, it adversely affects service, does it? *A* Yes.

Q What methods are there for maintaining a reasonable or proper or good power factor on a transmission line? *A* Apparatus referred to as condensers.

Q Any particular type of condensers? *A* There are static condensers.

Q Static condensers? *A* And there are rotating machines.

Q Rotating condensers? *A* Rotating machines, yes.

[*803*] *Q* Are they called rotating machines, or rotary condensers? *A* They are called condensers, synchronous condensers.

Q Synchronous condensers. Are generating units sometimes used as synchronous condensers? *A* We use some of our units occasionally.

Q You use some of your generating units as rotary condensers, occasionally? *A* Yes.

Q Do synchronous condensers serve any other purpose than to maintain power factors? Is the maintenance of power factors the principal objective? *A* Maintenance of voltage.

Q And that is dependent in part upon the maintenance of a proper power factor, is it? *A* Yes.

Q Well, I will put the question I asked you first: Is there any other purpose in the operation of a synchronous condenser than to maintain proper power factor and voltage on the transmission line? *A* Not that I know of.

* * * * * * [*833*]

Q I will show you a copy of Exhibit 26 for Identification and ask you whether as of June 30, 1939, this is a substantially correct representation of facilities owned and operated by the Connecticut Light and Power Company in and near East Hampton, Connecticut. *A* Since I am not connected with the Operating Department, I would have to obtain the information from others, as to whether it was or was not, because I did not, naturally, keep currently informed of all of the details, conditions or facilities of the company.

Q Well, Mr. Amberg, on the field trip inspection which Com-

mission counsel and engineers made in your company, did we not view some of these facilities, and didn't you explain to us what the facilities had been in and prior to 1939? [*834*] *A* Yes, but I am not familiar as to when certain things were changed or abandoned.

Q It is a matter of the exact date, then? *A* Yes.

Q If you cannot make a statement for June 30th or a particular day, can we say up until the discontinuance of the interconnection with the Connecticut Power Company in the town of Portland? *A* This is correct, as far as I can recall.

* * * * * * [*835*]

Q In the meantime, I will ask the witness one or two questions with respect to Exhibit 26. By referring to this exhibit, can you indicate the point at which the meters were located at which the electric energy purchased by the Connecticut Light and Power Company from the Connecticut Power Company up to approximately July 1, 1939, were located? *A* They were located just ahead of this point (indicating).

Q That is, referring to the point at which the dashed [*836*] line labeled "From Portland Connecticut Power Co. 13,800 v." joins the solid line marked "C. L. & P. Co., 13,800 v"? *A* Yes.

Trial Examiner: Towards the West High Substation or towards the Collins Hill Substation?

The Witness: Toward neither of those two. Toward the dotted line.

By Mr. Wahrenbrock: *Q* Was the metering equipment located on the line of the Connecticut Power Company? *A* I could not answer that question; I don't know where the line specifically ended.

Q Do you know who owned that meter or that metering equipment? *A* I don't recall that either.

Q What is Pole 110, which is referred to on the diagram on the map? *A* The location where that metering equipment was.

Q What was at that location?

* * * * * *

The Witness: I am not familiar with that detail.

By Mr. Wahrenbrock: [837] *Q* What do the figures and letters "13,800 v" indicate? *A* The nominal voltage on the lines.

Q And that voltage is 13,800? *A* Volts.

Q Are the lines indicated by the solid lines on this map single circuit lines or are some of them double circuit lines? *A* I could not answer that question either because I am not in close touch with those facilities. I have a general knowledge, but not specific knowledge as to details of that kind.

* * * * * *

Q Does the black line indicate a 13,800 volt electric line? [838] *A*. That is right.

Q What do the solid black triangles indicate? *A* They indicate sub-stations.

Q And do they indicate substations owned by the Connecticut Light and Power Company? *A* That is correct.

Q And the solid black lines and solid black triangles indicate facilities operated until approximately July 1, 1939, by the Connecticut Light and Power Company? *A* Yes.

Q Does the dashed line indicate facilities owned and operated until approximately the same date by the Connecticut Power Company? *A* As far as I remember, yes.

Q At the same time, were there other electric facilities of the Connecticut Power Company in the region shown on this map? *A* I don't know.

Q Well, at and near Colchester were there distribution facilities of the Connecticut Light and Power Company? *A* The Connecticut Light and Power Company, yes.

Q Were there lower voltage lines in the vicinity of Westchester, owned and operated by The Connecticut Light and Power Company? *A* Yes.

[839] *Q* And was the same true at Comstock Bridge? *A* As far as I know, yes.

Q And at West High Street Substation? *A* Yes.

Q And at the Leesville Substation? *A* Yes.

Q Had those facilities of the Connecticut Light and Power Company to which you have referred in your testimony been owned and operated since 1936? *A* May I get that question again?

Trial Examiner: The question will be read.

(The question is read by the reporter.)

By Mr. Wahrenbrock: *Q* During and since 1936? *A* Not all of those facilities.

* * * * * * [*840*]

Q I think I haven't framed the question I meant to put. Were substantially all of the facilities shown in solid black owned and operated by the Connecticut Light and Power Company during 1936 and up to approximately July 1, 1939? *A* Yes.

* * * * * * [*842*]

Q Mr. Amberg, I show you the top sheet of Exhibit No. 27 for Identification, and ask you if that sheet, together with the following two sheets, is a substantially correct representation of the facilities owned and operated by the respondent company at and in the vicinity of Winsted, Connecticut, and to Torrington, Connecticut? *A* The only answer I can make to that question is that it is a photostatic copy of the distribution maps as they were when we made a copy. As to how accurate they are, I don't know.

Q They are the maps used by the company in its operation [*843*] and in the conduct of its business? *A* They are the maps used by the company.

* * * * * *

Q Will you please explain, Mr. Amberg, the relation between —the relation on the first sheet of Exhibit No. 27, between the parallel, heavy dotted lines running down from Winsted through Burrville to the bottom of the map, and the insert on the lower right-hand corner of that map? *A* The relation—

Q Will you explain the relation between the insert and—

[844] *A* The insert is a continuation of the circuit shown on the main body of the map.

Q What does the heavy dotted parallel line represent? *A* A 27,600 volt open wire circuit, according to the legend.

Q Is that a double circuit or a single circuit line? *A* That is a two-circuit line.

Q What facilities are located in Torrington—what facilities of the Connecticut Light and Power Company are located in Torrington at the end of that line? *A* A transformer bank.

Q And what facilities are located in the Winsted—at the Winsted end of that line? *A* Two transformer banks, and some switching facilities.

Q What does the transformer bank in Torrington—what kind of transformers are those? *A* They are transformers used for stepping the voltage from 2300 volts to 27,600 volts.

Q What are the transformers at the Winsted end of the line? *A* They are used to step the voltage from 27,600 volts to 4600 volts.

[845] *Q* I ask you if you will explain by reference to these maps, where the Robertsville Hydro-Electric Plant of the respondent is located? *A* It is shown on the second sheet which is marked "Colebrook", close to the town line of Colebrook and Winchester on the Still River.

Q Will you describe the lines which connect the Robertsville Plant with the Substation of the Connecticut Light and Power Company in Winsted?

* * * * * * [847]

The Witness: It is one of the 4,600 volt distribution circuits of the Winsted District.

By Mr. Wahrenbrock: *Q* What is the capacity of that line? *A* I don't know.

Q In the normal operation of the company, is that line [848] connected through the substation at Winsted so that electric energy can pass from the Robertsville plant on to the 27,000 volt line

and from the 27,000 volt line through the transformers, on to the line at Robertsville? *A* May I have that question read?

(The question is repeated.)

The Witness: Yes.

By Mr. Wahrenbrock: *Q* Will you describe the substation in Winsted in general terms? *A* It consists of two transformer banks.

* * * * * * [850]

Q Mr. Amberg, I will ask you to consider an ordinary two-winding power transformer with primary leads, designated as A and B and secondary leads designated as C and D, and ask [851] you if that could not be used as an auto-transformer by connecting the leads B and C together and delivering the energy to the transformer over the leads A and B and taking the electric energy from the transformer over the leads A and D? Maybe you would like to have that read to you again?

* * * * * *

The Witness: I am not sure whether that would work or not. I am not acquainted with design problems of electric equipment. From the diagram, it would appear it might work.

* * * * * * [853]

Q Mr. Amberg, does an auto transformer consist of two coils on a core connected in series with three leads brought out from the case?

* * * * * *

The Witness: I am speculating in answering questions of that kind because I am not familiar with the design of [854] electrical equipment.

* * * * * * [855]

Q And then if you take an ordinary two-winding power transformer, and connect two of the leads together, as I have suggested to you previously, you would have in effect an auto transformer, have you not? *A* Diagrammatically, you have an auto transformer.

Q And so far as the principle upon which those transformers

operate, such a transformer would operate as an auto transformer, would it not? *A* I suppose it would.

Q Well, there isn't any difference in the principle upon which an auto transformer operates from the principle upon a two-winding transformer operates, is there? *A* That gets into theory. I don't feel qualified in answering that question.

Q Isn't that theory familiar to every engineer? *A* I am not familiar with the details of design.

Q I am not asking you about details of design. I am asking you about principles of operation. *A* I never operated a transformer.

Q You studied the theory upon which transformers do operate, haven't you? *A* No.

Q Isn't that a part of every elementary course in electrical engineering? *A* I only had a theoretical course, not the application [856] to design of equipment.

Q That is right. Now, I am asking you about the theory of the operation of a transformer, not the practical design, the principles upon which a transformer operates. *A* Well, in a two-winding transformer, as you referred to it, the relation from one to the other is strictly through a magnetic circuit.

[857] *Q* Have you completed your answer? *A* In the auto transformer, the current flows through the entire transformer.

Q Does that affect the principle upon which the transformer operates? *A* I think there is still a magnetic action.

Q Is there any difference in that action between an auto-transformer and a two-winding transformer?

• • • • • •

Trial-Examiner: Do you desire to have the previous question read in order to determine what he means by "that action"? Does the witness desire to have anything further read to explain the question?

The Witness: No. I think the action is similar.

By Mr. Wahrenbrock: *Q* I believe you said a moment ago that

the ordinary auto-transformer consisted of a single coil? [858] *A* Yes.

Q As a matter of fact, isn't that kind of transformer ordinarily made up of two different sizes of wire in the coil? *A* Yes, I believe so.

Q And isn't a lead brought out from the coil at the point of which the size of wire changes? *A* That is the point from where it would be brought out, yes.

Q In other words, you have the equivalent of one coil of wire of one size connected in series with another coil of wire of a different size, with leads brought out from the point at which they are connected in series and from the two opposite ends of each coil? *A* That is correct.

Q Does that complete your answer? *A* Although I believe there are cases where the size of wire in both coils is the same.

Q And as a matter of fact, you could have a two-winding transformer where the size of the wire in each of the two coils is the same as that in the other, could you not? *A* Yes, sir.

Q So that if you take—and I now go back to my original question—if you take an ordinary power transformer which has leads which we will call leads A and B on the primary and leads which we will call C and D on the secondary, and you [859] connect the leads B and C together and you supply electric energy to that apparatus by the leads A and B and you take electric energy from that apparatus by the leads A and D, you have an auto-transformer, have you not?

* * * * * * [861]

The Witness: You have.

By Mr. Wahrenbrock: *Q* And this Exhibit No. 29 for Identification correctly illustrates the diagram to which we have referred throughout our questioning? *A* It does.

* * * * * * [862]

By Mr. Wahrenbrock: *Q* I wish to refer now, Mr. Amberg to the trip the representatives of the Commission made to your com-

pany, to the Bristol substation of the Connecticut Light and Power Company and ask you where in that substation the controls are located by which the oil circuit breakers at Tower 474 of the Connecticut Power Company's 66 KV line, known as the Hartford to Falls Village line are?

* * * * * * [863]

The Witness: They are on a switchboard panel in the substation at Bristol.

By Mr. Wahrenbrock: *Q* How many such controls are there there? *A* As I recall it, there are two.

Q Who owns those controls? [*864*] *A* I don't know.

Q How are they operated? *A* I don't quite understand the question.

Q Who operates them? *A* A switchboard operator, I believe.

Q A switchboard operator employed by the Connecticut Light and Power Company? *A* Yes.

Q What do those controls do? *A* I am not certain as to that.

Q They control the operation of the oil circuit breakers on Tower 474? *A* They do in some form, but I don't know exactly how they function.

Q Well, they open and close those oil circuit breakers? *A* I do not know whether both of them open and close the breakers.

Q Well, together, they open and close, one or the other, or both of the oil circuit breakers on Tower 474? *A* They are used for some switching operations. The exact switching operations, I don't know.

Q And those switching operations are switching operations on what are known as the CP-1 and CP-2 lines? *A* They are.

* * * * * * [868]

Mr. Wahrenbrock: I have no further questions.

Cross Examination by Mr. BRANCH.

* * * * * * [870]

Q As far as you know, Mr. Amberg, has your company ever made changes in an ordinary power transformer such as was suggested by questions of counsel in connection with Exhibit 29,

which I show you, and then used that ordinary power transformer as an auto-transformer?

* * * * * * [871]

The Witness: To my knowledge we have never made such a connection.

* * * * * *

Q And in your opinion, would that be a feasible thing to do as a practical matter?

* * * * * *

The Witness: I don't believe it would be feasible to take an existing transformer and so operate it.

By Mr. Branch: *Q* And you say, as far as you know, that has not been done by your Company? *A* As far as I know.

Q Have you any knowledge of that ever being done anywhere? *A* I never heard of it.

* * * * * * [872]

Redirect Examination by Mr. WAHRENBROCK.

* * * * * * [874]

By Mr. Wahrenbrock: *Q* In your testimony yesterday you referred to a study you had made of the Winsted District. Are you able to fix the time of that study more definitely than you did yesterday? *A* No, but it is several months ago.

Q Since last Christmas?

* * * * * * [878]

The Witness: I believe it was after Christmas.

* * * * * * [880]

AUSTIN D. BARNEY

produced as a witness by the Federal Power Commission, being duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Will you state your address, Mr. Barney. *A* My business address is 266 Pearl Street, Hartford, Connecticut. My home address is Farmington, Connecticut.

Q What is your profession? *A* I am an attorney by profession.

Q Do you act as general counsel for the Hartford Electric Light Company? *A* At the present time I am vice-president and general counsel of the Hartford Electric Light Company.

Q Do you act as general counsel for the Connecticut Power Company? *A* At the present time, I am general counsel for the Connecticut Power Company.

Q How long have you acted as counsel for those companies? *A.* In respect to the Hartford Electric Light Company, I came to the company in December, 1924, as counsel, not as general counsel. I became general counsel in February, 1928, and I became vice-president and general counsel in 1936. I don't recollect just when I became counsel or general counsel for the Connecticut Power Company, but it runs back [*881*] over a period of eight or ten years. I forgot to check that.

Q And certainly since August of 1935? *A* Yes, sir.

Q And including August of 1935? *A* Yes.

Q Have you appeared upon behalf of the Connecticut Power Company and the Hartford Electric Light Company in response to a subpoena duces tecum which was served upon those companies and Mr. Ferguson?

* * * * * * [895]

By Mr. Wahrenbrock: *Q* I show you several photostatic copies and originals and I had a set of photostat copies to Respondent's Counsel, and I hand another set of photostat copies to the Examiner—

Mr. Branch: (Interrupting) How many papers are there here?

By Mr. Wahrenbrock: *Q* (Continuing) —and I call your attention to the original of the letterhead of the Connecticut Power Company, dated November 8th, 1937, being a letter of two pages, and I ask you if you recognize the original and the signature thereto.

Mr. Branch: Excuse me—have we more than one copy of the same thing, or is it just one? I have eight or ten sheets which you handed me.

Mr. Wahrenbrock: One copy of each item, I believe.

The Witness: That is my signature.

By Mr. Wahrenbrock: *Q* And that is an original letter in the files and is a letter which you wrote under date of November 8th to the Commission? *A* Yes.

Q And following that letter are five pages of tabulations, and I ask you if those are the tabulations which are included with the original letter which you sent?

Trial Examiner: Do those tabulations all appear in the [*896*] copies we have?

Mr. Wahrenbrock: Only the first two pages appear in the copies.

Mr. Branch: How are these headed? I am finding it a little difficult to follow you?

Mr. Wahrenbrock: The first page is headed, "Report on sale of Electric Energy",—

Mr. Branch: (Interrupting) That is enough. I have that.

Mr. Wahrenbrock: The second one begins the words "Demand and Energy Charge"?

Mr. Branch: Thank you.

By Mr. Wahrenbrock: *Q* Do you recognize the originals to which I have referred, in the Commission's files, as the enclosure with the letter which you have previously identified? *A* Yes, I presume those are the originals. The letter did have some tabulations. Without a detailed checkback, I could not say, but I do not question that they are the ones.

Q I call your attention to the original letter in the files dated September 10, 1937, on the letterhead of the Connecticut Power Company, and ask you if you recognize that two-page letter which contains what purports to be your signature contained thereon? [*897*] *A* That is my signature.

Q That is your signature and that is the letter which you sent under that date to the Commission? *A* Yes.

Q I call your attention to a carbon copy which appears in the second file dated June 28th, 1937, of a letter addressed to the

Connecticut Power Company, over the signature of Leon M. Fuquay, and ask you if that carbon copy is a copy of a letter which was received by the Connecticut Power Company? *A* What was the date of that letter?

Q June 28th, 1937. *A* I think it is.

Mr. Wahrenbrock: Mr. Examiner, these photostats are photostats of the three letters and the two pages of enclosures to one letter which has just been identified by the witness.

Trial Examiner: Does counsel desire to offer this as one or as three exhibits?

Mr. Wahrenbrock: As one. To be identified as Exhibit 30.

Trial Examiner: Do they all deal with the same subject matter?

Mr. Wahrenbrock: Yes.

Trial Examiner: Will you state so that we can have a clear picture of just what they are, in describing the exhibit, which this is portions of the correspondence dealing with?

Mr. Wahrenbrock: Portions of correspondence dealing with [898] the filing as rate schedules, by the Connecticut Power Company, of the contracts between the companies, referred to in the letters.

Trial Examiner: Will you make that just a little more clear and say just what companies?

Mr. Wahrenbrock: The Hartford Electric Light Company, the Connecticut Light and Power Company, and the Torrington Electric Light Company.

Trial Examiner: You have asked that they be marked for identification?

Mr. Wahrenbrock: I thought I did.

Trial Examiner: And I have not ruled on that point yet.

Mr. Wahrenbrock: May they be identified as Exhibit 30?

Trial Examiner: The reporter will mark them as Exhibit 30, for Identification.

(Documents referred to are marked Exhibit Number 30 for Identification.)

Mr. Wahrenbrock: I offer them in evidence as Exhibit 30, those marked Exhibit 30 for Identification.

Trial Examiner: Is there any objection?

Mr. Branch: May I confer with my associates?

Trial Examiner: You may. And meanwhile I suggest that these other copies be stapled.

Mr. Branch: I wish to make it clear that nothing that I say is intended to be in the nature of any criticism on the [899] ground that these are copies. I want that understood and I am merely asking for information as to the purpose for which they are offered.

Trial Examiner: Will you state the purpose, Mr. Wahrenbrock?

Mr. Wahrenbrock: These are to lay the basis for the proof of contracts under which electric energy is sold by means of facilities owned or operated by the respondent for the transmission of electric energy in interstate commerce.

Mr. Branch: I am afraid that leaves me just about as much in the dark as I was before. Do you offer them as proof of the statements that are made in them by the writers of the letters, or what?

Trial Examiner: Will counsel for the Commission answer the question of Respondent's Counsel?

Mr. Wahrenbrock: I am not sure that I understand the question, Mr. Examiner.

Trial Examiner: Will you restate that so that Commission Counsel can understand it?

Mr. Branch: I am looking for information as to the purpose for which they are offered. The previous explanation leaves me still in the dark and I want to know whether they are introduced as evidence of the statements that are contained in the letters, or what they are evidence of, and for what specific purpose.

[900] Mr. Wahrenbrock: They show the filing by the Connecticut Power Company of certain power contracts, in response to a request from the Federal Power Commission. They are offered to show those filings.

Trial Examiner: And as part of a general purpose, as you stated a while ago? Do you mean that the proof of that filing is part of that general purpose?

Mr. Wahrenbrock: Yes.

Mr. Branch: I am not inclined to object to them on my understanding of the statement of counsel.

Trial Examiner: All right. They will be admitted as Exhibit 30.

(Exhibit Number 30 for Identification was marked Exhibit 30 in Evidence.)

By Mr. Wahrenbrock: *Q* I direct your attention, Mr. Barney, to the letter of September 10th, 1937, written by you, which is a part of Exhibit 30, and to the third paragraph of that letter in which you say, "It may be true that some of the energy delivered by the Connecticut Power Company to the Hartford Electric Light Company or to the Connecticut Light and Power Company and the Torrington Electric Light Company may at times have interstate origin, by virtue of the operation of the Connecticut Valley Power Exchange."

Mr. Branch: You don't care to read the rest of the [*901*] paragraph?

Mr. Wahrenbrock: It is in evidence and can be read by anybody who sees the exhibit.

By Mr. Wahrenbrock: *Q* I ask you if you are still of that opinion?

Mr. Branch: I object. I have a very high regard for Mr. Barney's capabilities in many lines. I did not realize that you were calling him as an engineer. If you are calling him as a lawyer, I am sure he is well qualified, as he is also in the other duties he has had to perform, but it seems to me that for you to try to prove your case by getting a lawyer to do it is rather unusual. I don't know what Mr. Barney's opinion is going to be on this.

Trial Examiner: I am inclined to agree with counsel that no groundwork has been laid as to the qualifications of this witness to pass upon the question.

By Mr. Wahrenbrock: *Q* Did that statement represent the position of the Hartford Electric Light Company at the time the letter was written?

Mr. Branch: The same objection.

Trial Examiner: Of course, that is as to the position of the Company and is not necessarily an engineering question.

Mr. Branch: I think that is true. I don't think we are going to get very far on this anyway, but it does seem to me [*902*] strange that the Federal Power Commission has to try to prove its case from what somebody else, whose identity is not disclosed, may think about the thing.

Trial Examiner: We will admit the last question and the possible answer, for whatever they may be worth. I am not in the position of a jury here, and the evidence can be weighed as to its materiality afterwards.

Mr. Branch: I am not at all afraid that your mind is going to be poisoned by Mr. Barney.

Trial Examiner: You may answer the question.

The Witness: That statement in the letter was made and is in the nature of an assumption or a possibility, in reply to a letter from the Federal Power Commission, dated June 28th, in which, I think, that they suggested the possibility of out-of-the-State energy reaching Bristol and Torrington. I personally don't know whether any such energy does do that. The rest of the paragraph points out that as far as the contracts were concerned, they had no reference to out-of-the-State energy. The statement cannot be construed as a statement of fact or a statement of opinion that in fact any energy did so flow.

By Mr. Wahrenbrock: *Q* That statement did represent the position of the Hartford Electric Light Company in response to the questions put by the Federal Power Commission in the letter to which you [*903*] have referred?

Mr. Branch: I think it would be fairer if he is stating the position of the Hartford Company, that you should not confine it to one very qualified sentence in the letter, but to the whole letter.

Trial Examiner: I think that is true.

The Witness: Mr. Examiner, may I correct the record at this point, because I think there is some confusion?

When you are speaking of the Hartford Company, don't you really mean the Connecticut Power Company, because this all refers to the Connecticut Power Company and not to the Hartford Electric Light Company?

Trial Examiner: Yes, I think that is what he means, because I believe the witness could not be expected to know what represented the opinion of the Hartford Company in the same way.

Mr. Wahrenbrock: I will change the question then, Mr. Examiner.

By Mr. Wahrenbrock: *Q* I will ask you, Mr. Barney, if this letter including the paragraph to which I have referred, and referring to that paragraph in particular, represented the position of the Connecticut Power Company at that time?

Mr. Branch: I think it is understood that I have an objection going to this entire line of questions, as being im- [*904*] material and incompetent? Mr. Barney, being a lawyer, knows that when I say "Incompetent", I am speaking about the opinion of the Company and not his own opinion.

Trial Examiner: It is so understood.

A It represented the opinion of the General Counsel of the Connecticut Power Company, to which the letter of June 28th was referred, and the opinion of the General Counsel was that even assuming there was some such energy, what of it? Because the contract did not have anything to do with any out-of-the-State energy.

Trial Examiner: Will you speak just a little louder?

The Witness: In so much as the matter of opinion has been opened up, I would like to say that so far as my information and knowledge is concerned, the Connecticut Power Company never has admitted that these contracts that were filed were interstate contracts or that there was any necessity for filing them. They

were filed at the conference with the members of the Power Commission in Washington, purely as a matter of courtesy and nothing else.

By Mr. Wahrenbrock: *Q* You wrote this letter in response to the Commission's letter of June 28th, which is a part of this same exhibit? *A* Yes, sir.

Q You wrote this letter on behalf of the Connecticut Power Company? [*905*] *A* Yes.

Q And you spoke for the Connecticut Power Company? *A* Yes.

Q And you knew what you said there? *A* Yes, sir.

Q The letter was written after due consideration upon behalf of the Company? *A* Yes, sir.

Q And you took into account the Company's knowledge of all the facts? *A* Took into consideration the knowledge of all of the facts the General Counsel had, or was able to obtain upon consultation with others.

[*906*] *Q* From consultation with whom? *A* With the officers of the company.

Q Has the position of the Connecticut Power Comj any changed since that date, in that respect? *A* Well, could you specify a little more in detail what you mean?

Q Is the statement of the position of the Connecticut Power Company made in this letter of September 10th, and directing your attention particularly to the first sentence of the third paragraph of that letter, which I previously read, is that position a position which has been consistently maintained by the company?

Mr. Branch: I think it should refer to the position in the entire letter, from which that is taken. By itself it is hardly an adequate expression.

Trial Examiner: I think that if the answer is in the affirmative it will cover the sentence as well as the rest of the letter.

The Witness: So far as I know—

Mr. Branch: Excuse me. I understand my objection goes to this entire line of inquiry.

Trial Examiner: Your objection to the entire line is overruled. You may answer.

The Witness: So far as I know, I can only speak for the [907] opinion of the general counsel, and that is, the position of the Connecticut Power Company has not changed in respect to that entire letter, including the sentence you refer to.

By Mr. Wahrenbrock: *Q* You can also speak as an officer of the company, can you not? *A* Not as the Connecticut Power Company, no.

Q Does the position of the Hartford Electric Light Company differ from that of the Connecticut Power Company with respect to the matters touched on in this letter?

Mr. Branch: Same objection. That is one step further.

Trial Examiner: I believe the Hartford is a party to the contract, and the witness is himself an officer and vice-president of the Hartford Company. I will permit the question to be answered.

The Witness: Well, there is nothing in the business of the Hartford Electric Light Company that is involved in that letter, so far as I can see. This letter does not express any opinion in respect to the position of the Hartford Electric Light Company.

By Mr. Wahrenbrock: *Q* Have any of the officers of the Connecticut Light and Power Company, or representatives or attorneys of that company, ever expressed to you their disagreement with the position expressed in this letter of September 10, 1937?

[908] Mr. Branch: I object to it. It is clearly incompetent.

Trial Examiner: I think that is negative evidence, and it is not admitted.

Mr. Wahrenbrock: May I be heard on that, Mr. Examiner?

Trial Examiner: You may.

Mr. Wahrenbrock: The question is raised by the show cause order as to whether the respondent has wilfully and knowingly violated any of the requirements which have been imposed upon it by the Commission. There may be some room for argument as to how much subjective intent enters into the question of wilfully and knowingly violating those requirements. Anticipating some such

argument, I propose to show certain facts about the subjective intent of the responsible officers of the respondent. Subjective intent is necessarily a little bit elusive to get at. A certain amount of negative evidence is necessary, in the absence of anything else to show what goes on in men's minds.

Trial Examiner: I will say for counsel here, this is not a matter, however, in which he is dealing with a question of the negative of the respondent. Counsel might ask the witness what the Hartford Company said or did, but not what they did not. You are asking here a question as to negative action on the part of a third party, and it will not be permitted.

[*909*] Mr. Wahrenbrock: The record will show, if it does not already show, that the Connecticut Power Company and the Connecticut Light and Power Company have contractual relationships under which they exchange electric energy which is supplied to the Connecticut Light and Power Company from the Connecticut Power Company's 66,000 volt line from Hartford to—

Mr. Branch: Will you specify the contract or arrangement by which the Connecticut Light and Power Company supplies any energy to that line? It is new to me. If it is so, I have never heard of it.

Mr Wahrenbrock: By which the Connecticut Light and Power—

Mr. Branch: No, the respondent here supplies any energy to that line. You said they exchanged energy, which to my mind meant that if you exchange, each party gives something.

Mr. Wahrenbrock: If I said "exchange energy", I misspoke myself. I do not mean to say exchange energy. I mean to say the Connecticut Light and Power Company receives energy from the Connecticut Power Company.

Mr. Branch: That is quite a different proposition.

Mr. Wahrenbrock: That is a proper correction and I am glad to have it made. And that at one time the Connecticut Light and Power Company was a member of the Connecticut Valley Power Exchange, [*910*] and at that time did exchange energy by means

of some of the same facilities that are involved. The operations and the actions taken by these several companies at the time the Public Utility Act of 1935 was enacted were in some measure and to some extent, as shall be shown, taken in concert. I expect to probe as to what extent these attitudes were similar, and to what extent they resulted in concerted action, as indicative of the intent with which the parties had done the things they have done. That is, the respondent has done.

Trial Examiner: If you afterwards lay such a groundwork, then the question may be admissible. It is not in the present state of the record admissible in its negative form.

Mr. Wahrenbrock: May I have the question read to ascertain whether it says what I think it does?

Trial Examiner: You may. Will the reporter read the question.

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Wahrenbrock: I call the examiner's attention, if you please, to the fact I do not ask whether they have failed to do something. I have asked whether they have ever expressed disagreement; whether they have ever actually positively expressed disagreement.

Trial Examiner: Couldn't counsel ask the question [*911*] if they agreed with it?

Mr. Wahrenbrock: I will be glad to ask that next.

Trial Examiner: It seems to me that would be more in line with positive evidence, or as a general question as to what they did believe.

By Mr. Wahrenbrock: *Q* Have any representatives or employees or officers of the Connecticut Light and Power Company ever expressed to you their agreement with the position taken in the letter of September 10th, to which we have been referring, and referring particularly to the first sentence in the third paragraph of that letter? *A* Well, so far as I can know, I don't think any of the officers or lawyers of the Connecticut Light and Power Company knew of the existence of this letter of September 10,

1937, prior to this proceeding. Now, that is only my belief. So far as anything I have done, I don't think they did.

Q Yes. Now, I didn't ask you whether they knew about the letter, or whether the letter had been called to their attention. I asked you whether they expressed to you, or you had heard them express the position as expressed in the letter.

Mr. Branch: I think that is altogether too broad, and I object to it on that ground.

Trial Examiner: I will allow the question. You may answer the question. [*912*] Note an exception for Mr. Branch.

The Witness: That is a difficult question to answer, because I am not quite sure what you mean by position, therefore, I will have to answer it according to my understanding. In respect to the claim or position that the contracts referred to in the letter were entirely intrastate contracts. I believe that the counsel and officers of the Connecticut Light and Power Company are in entire agreement. I don't recollect any specific conversation relative to the matter, or relative to the specific contracts. There has been over a period of time discussions, not formal—in the manner that occur when two or more attorneys get together, as to the whole situation, relative to the Connecticut Light and Power Company, the Hartford Electric Light Company, or any other cases that might have come to the attention of counsel. Therefore, I cannot say, except from my impression as to any definite specific statement as to agreement by the officers of the Connecticut Light and Power Company. In respect to the first sentence in the third paragraph of the letter September 10th, again I would like to repeat that that is not a statement of a position other than a possibility, that energy, out of State energy, might flow over those lines. As to that matter, I have heard a great many engineers and lawyers argue pro and con. I do not, I cannot say as to the position of the officers [*913*] of the Connecticut Light and Power Company on that particular point from any direct inquiry on my part.

Q Mr. Barney, isn't it true, or is it true, that in informal conversations with the officers and attorneys of the Connecticut Light and Power Company, they have admitted the possibility of Massachusetts energy being on the CP-1 and CP-2 lines at times? *A* I was trying to recollect any specific times, even up to this noon. I should say in answer to that that there probably—in the way that you put it, they have considered that possibility. If you ask me for a specific time and date, I couldn't give them to you.

* * * * * * [*918*]

By Mr. Wahrenbrock: *Q* I will show you, Mr. Barney, a one-sheet document which has been designated by the Commission's staff "The Connecticut Power Company, Rate Schedule FPC-5," and ask you if with the exception of the designation and the stamp, that is the document which was filed by your letter of November 8th which is a part of Exhibit 30 for Identification.

* * * * * * [*920*]

The Witness: It is.

By Mr. Wahrenbrock: *Q* Referring further to Exhibit 31, I will ask you what is the contract under which electric energy is sold by the Connecticut Power Company to the Torrington Electric Light Company at the terms specified in that exhibit?

* * * * * * [*921*]

The Witness: At the present time, and also I believe at the time that Exhibit 31 was filed, that is, November 9, 1937, Torrington was being served under more or less of an oral arrangement at a rate or billing price mutually agreeable to the two parties. My recollection is that was the arrangement on November 9th, 1937, and I think it still continues. I cannot say that the billing price is exactly the same. My recollection is that originally there was an old contract which I think goes back to 1912, which from time to time has been varied by letter and by oral action of the parties, so that in the opinion of counsel for the Company, the Connecticut Power Company, it is very doubtful if there is any written contract in existence that either party could stand on.

* * * * * * [922]

By Mr. Wahrenbrock: *Q* Are the terms set forth in Exhibit 31 the terms under which electric energy has been sold to the Torrington Electric Light Company since that rate schedule was filed with the Commission? *A* Have the terms been changed?

Q Are they the same terms? *A* I cannot personally answer that. I would have to check it. As far as I know, there is no written or any other contract. The arrangement is the same, but the billing may have been changed.

Q At the time you filed that rate schedule, Exhibit 31, were there any terms of the effective agreement, between the Connecticut Power Company and the Torrington Company with respect to power factor? *A* That I could not say without getting other people to tell me about it. If you are referring to that old agreement, in so far as counsel is concerned, there was never any reference to that old contract that ever came across counsel's desk, in [923] so far as any dealings with the Torrington Electric Light Company are concerned. Whether or not under the arrangement continuing over a period of years, power factor was part of the billing, I cannot say; I would have to ask somebody else.

Q And do you know what the delivery point for the delivery of electric energy by the Connecticut Power Company to the Torrington Electric Light Company, under the terms of that agreement, that effective agreement, as of the date of the filing of Exhibit 31 as the rate schedule was? *A* No, not from my personal knowledge or recollection.

Q Mr. Barney, could you make available to me for inspection the original contract which you have referred to as possibly in 1912, and such letters or correspondence as relate to any modification or change in the terms of that contract, and any memorandum of oral understandings with respect to the terms of that contract? *A* Well, Mr. Examiner, there is a whole lot of things that are not pertinent, at least in my opinion, to this particular matter. I don't know just how far we can go, and I would like

to say that it is not the Federal Power Commission's counsel that bother us, any more than the counsel for the Connecticut Light and Power Company. In my opinion, there is nothing in the old Torrington contract, and it is a file that is about six inches or more thick, that is related to this [*924*] particular matter, and there is a lot of miscellaneous correspondence in it that has absolutely nothing to do with the Connecticut Light and Power Company or interstate transactions, or anything else. I am just raising the question because there is no limit to what you can produce or can be asked for, and I rather object to going too far in this matter.

* * * * * * [*925*]

The Witness: It has been our opinion, and I state it here again, that the 1912 contract has not been in effect for some time because it has been subject to so many changes since 1912, that long before I had anything to do with it, it was really out of the window as a legal agreement.

* * * * * * [*929*]

Mr. Wahrenbrock: Mr. Examiner, I now show to counsel for the respondent four documents which have been supplied to me by Mr. Barney, in response to the subpoena that was served upon the Hartford & Connecticut Power Company and Mr. Ferguson, which I propose to have identified separately.

Mr. Branch: I don't know whether this is the appropriate time for me to do so or not, but I do want to do this at the earliest possible moment. This brings us to a matter which is of some importance, particularly in view of the scope of the subpoena duces tecum which was served not only on Mr. Barney but on us. The subpoena which was served upon us, for instance, directs us, among other things, to produce all legal opinions [*930*] relating to eight specified matters—the terms are very large. I take the words "discussions", or directly relating or concerning any of the following—applies to "legal opinions". And then there is another provision which includes all bills rendered, and all journal

entries for expenditures incurred for legal services in relation to or involving the determination of the applicability of any provision of the Public Utility Act of 1935, and so forth and so forth.

Mr. Barney's subpoena, I am advised, was rather broad in scope, and it was definitely under this that he gave Mr. Wahrenbrock the documents in question. I don't recall that I have ever been in a proceeding where it was sought by a subpoena duces tecum to require legal opinions and other communications between attorney and client, or bills rendered for legal services to be produced. The implication of such request is pretty obvious.

If we are to go into all those matters, it seems to me that we are going to have a mass of legal opinions and discussions as to the correctness of legal opinions, the facts upon which they were based, the incorrectness or correctness of assumptions made in them, and a great variety of other things. We will prolong this hearing tremendously, and it seems to me improper, if we go into these matters. I certainly don't recall ever having anybody suggest it was proper to obtain in such a proceeding lawyers' bills or amounts in- [*931*] curred for expenditures.

I wish to raise, in behalf of the Connecticut Light and Power Company, and I think Mr. Barney will—I understand in so far as is necessary, he will support me in raising on behalf of the Hartford Electric Light Company and the Connecticut Power Company, and any other individuals connected with those companies in any connection, and also in connection with the individuals connected with the Connecticut Light and Power Company, the question of privilege between attorney and client.

That privilege is, of course, very broad. I assert it, and it seems to me perfectly clear that this would prevent any use whatever in any connection with each of these documents which have been offered to me.

There is one here that doesn't seem to be identified, whether it came from an attorney or was sent to an attorney as such, I don't know, so my statement as to that is not as positive as it might be. We might have to find out. The other three are clearly com-

munications between attorney and client, and come within the clearest possible scope of privilege. I therefore raise the objection to any use of these documents on that ground.

I don't know—I am rather surprised that counsel for the Federal Power Commission should undertake in this way to get opinions of counsel, and I certainly find neither in the Act nor in any authorities any justification for making use [*932*] of material in this way. The matter seems to me so obvious that it seems unnecessary to cite authorities or anything of that kind. If the Examiner is in any doubt, I should like the opportunity to prepare and submit a memorandum.

Trial Examiner: I should like counsel to prepare a memorandum on that subject and I also will allow you some opportunity to examine and see whether they do constitute a matter of privilege or not. I have to have some preliminary knowledge.

Mr. Branch: I also want to suggest that this matter of immateriality—

Mr. Wahrenbrock: May they be identified so that we know what we are talking about?

Trial Examiner: They may be marked for identification.

Mr. Branch: They will just be marked for identification, subject to my objection. I felt it was incumbent to raise my objection at the earliest possible moment. My objection is to any further use other than merely having some numbers put on them, and I take it that I am not waiving—

Trial Examiner: Questions in connection with these documents will not be asked at the present time.

Mr. Branch: I understand the Examiner rules that by not making any further objections to just marking them, I am not waiving my—

Trial Examiner: You are waiving nothing in that respect, [*933*] and I say I would like to have you prepare a short memorandum on that before tomorrow morning, if you can.

Mr. Wahrenbrock: Mr. Examiner, at the proper time, I would

like to be heard on the subject, but I would like to get them identified first.

* * * * * * *

(The documents referred to were marked as Exhibit Nos. 32, 33, 34 and 35 for identification.)

* * * * * * [936]

By Mr. Wahrenbrock: *Q* Can you explain what this Exhibit 35 for Identification is? *A* That is a statement of the savings, or the amount—the Connecticut Light and Power Company's share of the savings paid to it for the twelve months ending August, 1935, during which time it was as I remember, a member of the Connecticut Valley Power Exchange, I believe, and was prepared at my request by Mr. Mayott, in response to Item 2 of the subpoena.

* * * * * * [941]

Cross Examination by Mr. BRANCH.

Q Mr. Barney, some reference has been made to the fact that the Connecticut Power Company filed certain letters and certain contracts with the Federal Power Commission, and there have also been questions as to the attitude of the Connecticut Power Company on certain matters. As far as you know, has the Connecticut Power Company ever taken the position with the Federal Power Commission that it was subject, or is subject to the jurisdiction of that Commission, which extends to companies which are designated as public utilities under part 2 [942] of the Act. *A* In connection with the filing of the contracts that have heretofore been mentioned in the testimony, those contracts were filed more or less as a matter of courtesy and accommodation and request of the Federal Power Commission, after a conference held in Washington. It is true that they were filed, but in so far as the Connecticut Power Company is concerned, it has never filed them under what I think was Order No. 44, of the Federal Power Commission, relative to the filing of wholesale contracts, involving interstate transactions. I am not sure that is the proper reference, but I think that is the correct order.

Q Now, I will ask you a somewhat wider question. Has the Connecticut Power Company ever admitted or stated to the Federal Power Commission or its representatives that it is subject to that jurisdiction of the Federal Power Commission which is dependent upon being a public utility as defined in part 2 of the Act? *A* The Connecticut Power Company has conformed with the accounting order, and has set up its accounts in accordance with the prescribed classification by the Federal Power Commission and also has made the readjustments, or the original cost studies thereunder required. It hasn't to date had an argument as to jurisdiction with the Federal Power Commission, because it did comply. As owner of the Agawam [943] transmission line, it was the opinion of counsel that it would be rather difficult to deny jurisdiction as a public utility on that account.

Q Has it ever admitted that the contract—that the contracts with the Torrington Electric Light Company, or the contracts with the Connecticut Light and Power Company, are contracts involving interstate commerce? *A* Not so far as I know. The correspondence introduced with some other correspondence has never admitted that those were interstate contracts, as far as I know.

Q Now, Mr. Wahrenbrock has asked you some questions in regard to your letter to Mr. Fuquay's attention, directed to the Federal Power Commission, dated September 10, 1937, which is—

Mr. Branch: Can you enlighten me as to the number of that exhibit?

Mr. Wahrenbrock: I think it is Exhibit No. 30 for identification.

Mr. Branch: Isn't it in evidence?

Mr. Wahrenbrock: This is my copy.

Mr. Branch: No. 30; whether it is 30 for identification or Exhibit 30, makes no difference now. I will refer to it simply as Exhibit 30.

By Mr. Branch: *Q* In that letter you state that the Connecticut Power [944] Company has a steam station in this section of its

territory, and the Hartford Electric Light Company has always furnished it with its requirements. Continuing, I read, "The Connecticut Power Company has to obtain sufficient steam capacity for supplying its load on its interconnected system from someone, and has always obtained it within the State of Connecticut." Is that statement correct as of all times since August, 1935, with the exception possibly of brief periods during an emergency—or, I will leave out "during emergency". Is that correct as of all times since August 26, 1935? *A* So far as I know, it is.

Q I continue to read. "It"—referring obviously to the Connecticut Power Company—"never has had any contracts, oral or written, for firm capacity outside of the State of Connecticut." Is that correct as of all times since August 26, 1935? *A* May I first correct my answer to the prior question. There was a period during the flood of March, 1936, where—I can't say without going to other sources as to where any emergency was supplied from, or capacity. With the exception of the emergency flood, my answer is correct.

Q Now, I think there is a question pending.

Mr. Branch: Will you read it, please.

Trial Examiner: The reporter will read the question.

[945] (Whereupon the last question as above recorded, was read by the reporter.)

A So far as I have any knowledge, it is correct.

Q You are familiar with the important contracts of the Connecticut Power Company, as general counsel, are you not, Mr. Barney? *A* I am unless they have been holding out on me.

Q Unless what? *A* Unless they have been holding out on me.

Q And any contract for firm capacity would be an important contract about which it would be your duty to be familiar, would it not? *A* Well, let me say it should. I am not an officer of the company.

Q Now, I read to you from this paragraph in the same letter. Have you a copy of this before you? *A* Yes, sir.

Q "It may be true that some of the energy delivered by The Connecticut Power Company to The Hartford Electric Light Company or to the Connecticut Light and Power Company and The Torrington Electric Light Company may at times have interstate origin by virtue of the operation of the Connecticut Valley Power Exchange." I will ask you whether that particular sentence was written with particular reference to a letter from the Federal [946] Power Commission to you—there is some reference in this letter—there is reference to a letter of September 7th. *A* The letter of June 28, 1937.

Mr. Branch: I am sorry Mr. Davis isn't here.

By Mr. Branch: *Q* Have you before you that letter of June 28, 1937? *A* Yes.

Q Was that sentence written in the letter written with particular reference to some statement by the acting secretary of the Federal Power Commission in a letter dated June 28, 1937? *A* The letter of September 10th, which I believe is the letter counsel is speaking of, to the Federal Power Commission, was written in response to the letter of June 28th, from the Federal Power Commission, and signed by Mr. Fuquay, the acting secretary. In the letter of June 28th from the Federal Power Commission, it was suggested that energy delivered to the Connecticut Light and Power Company under the agreement dated December 16, 1936, and to the Torrington Electric Light Company, may in part at least, be derived from sources outside the State. It was in response of that statement that the language in the letter of September 10th appeared.

Q In making that statement, did you mean to admit that energy delivered by the Connecticut Power Company to the [947] Connecticut Light and Power Company, and the Torrington Company, did actually have interstate origin?

Mr. Wahrenbrock: Mr. Examiner, I think the letter speaks for itself in that respect.

Mr. Branch: He has asked him questions concerning his posi-

tion, and I want to state his position in regard to this, and I think it is proper cross-examination.

Mr. Wahrenbrock: My questions, which were vigorously objected to, went to the maintenance of the position as stated in the letter subsequently, and the position of the Connecticut Light and Power Company with reference to that position of the Connecticut Power Company. I didn't attempt to step outside and divorce from the record the question of the position as stated in the letter.

Trial Examiner: I think that the question is admissible. The objection is overruled.

The Witness: There was no intention of admitting the claim of the Federal Power Commission, even as the letter states—even if it was true, and certainly the writer didn't know as a fact, if it was true or not, the contracts were still all intrastate contracts, as stated in the letter of September 10th. That was the position of the Connecticut Power Company.

[948] *Q* Has it been the position of yourself and of the Connecticut Power Company at all times that there is no contractual relationship between the operation of the Exchange and the intrastate companies in Connecticut, and there is nothing in the specific contracts to which the Federal Power Commission has referred as being the contracts relating to Torrington, and with the Connecticut Power and Light Company for its supply at Bristol, which creates any interstate obligations, whether as to sale or transmission?

Mr. Branch: That is a pretty long question, and maybe I had better have it read back.

Mr. Wahrenbrock: I should like to have it repeated also.

(The question is read.)

Mr. Wahrenbrock: Mr. Examiner, I object to that question as being scarcely susceptible of interpretation as to what an interstate obligation is.

Mr. Branch: That is the language in the letter which Mr. Wahrenbrock introduced in evidence.

Trial Examiner: I think in view of that fact, we will allow the question, if the witness understands it.

The Witness: Trying to avoid conclusions of law as to the interpretations of contracts, I can say that the contracts between the Connecticut Power Company and the Connecticut Light and Power Company for service at Torrington and Bristol are firm power contracts. The Connecticut Power Company has a firm [949] primary power contract with the Hartford Electric Light Company covering all of its requirements, including Torrington. It also has another contract with the Hartford Electric Light Company—a primary power contract—covering The Connecticut Power Company's obligations to Connecticut Light and Power Company at Bristol. The Connecticut Power Company is also a member of the Connecticut Valley Power Exchange. There is nothing in the Exchange agreement or in its operations, so far as I am familiar with them, that in any way concerns the firm primary power.

By Mr. Branch: *Q* And now, to supplement that question, this letter contains this sentence, "The Exchange agreement, so-called, involves only surplus power, when and if available, and is in reality, merely a voluntary operating plan subject to termination at the will of any of the participating parties, and is not in any sense a contract." Is that a correct statement of the situation as you understand it? *A* As I understand it, that is the situation.

Q Has that been so at all times since August 26th, 1935? *A* Subject to the interruption of the great flood in 1936, and the emergency period which extended over quite a period of time, as I recollect. Subject to that period of time, that is correct.

[950] *Q* Even during that period—I don't suppose you meant that during that period of time it became anything other than a voluntary plan? *A* Excepting that period of time, which as far as I know, there was not Exchange operations under the agreement. It was all emergency exchange.

Q What you mean is that there were not any operations under the agreement during that time, not that the nature of the Exchange agreement was modified at that time? *A* The old Exchange was terminated on August 24th, as I recollect.

Q Is that correct, Mr. Barney, that during the emergency, you mean, that that did not operate—the exchange did not operate? *A* Not on Exchange basis. I would have to refresh my recollection of what the status was, but as I remember there was not any permanent Exchange as had existed before and which existed under new membership after the emergency period. It was an emergency exchange—that is all that happened.

Q And in this letter you also say:

> "The very nature of Exchange transactions are such that no firm power contract could be based thereon."

Was that true as of September 10th, 1937? *A* According to my understanding, that is correct.

Q And has that also been true at all times since August [*951*] 25th, 1936? *A* Again excepting that emergency period, I think it is correct.

Q Now, in this letter you also say—I call your attention to the first full paragraph at the top of page 2, Mr. Barney—the first sentence reads:

> "As to filing any monthly reports on Form IT-1, the same difficulties arise, except more so, as were found in reporting the exchange transactions on this form."

Now, this is the sentence to which I wish to direct your attention:

> "There being no direct transactions between companies, in respect to any interstate energy, it is impossible to use that form."

Is it true that there were no direct transactions between either the Connecticut Power Company on the one hand, or the Connecticut Light and Power Company and the Torrington Company on the other hand, with respect to any interstate energy?

Mr. Wahrenbrock: Mr. Examiner, I object to that question, unless it is specified whether the transactions refer to contractual relationships or actual delivery of energy.

Trial Examiner: I think the point is well taken.

Mr. Branch: My exception may be noted; I will reframe the question.

[952] By Mr. Branch: *Q* Were there any transactions between the Connecticut Power Company on the one hand and either the Connecticut Light and Power Company or the Torrington Company on the other hand which called for delivery of any energy which was generated outside of Connecticut? *A* May I have that question repeated?

Trial Examiner: I think the objection was to the use of the word "transaction" without further explanation.

Mr. Wahrenbrock: I ask that in that question as so framed, the meaning of "called for" be made definite.

Trial Examiner: The reporter will repeat the question.

(The question is repeated.)

Mr. Branch: I should have said, "Were there any arrangements?"

Mr. Wahrenbrock: That is subject to the same criticism.

Trial Examiner: Do you mean arrangements in the sense of agreements?

Mr. Branch: Agreements or understandings.

Trial Examiner: Does that answer your objection?

Mr. Wahrenbrock: If the question is: Was there any contractual obligation to deliver power from outside of the State, that is one thing. If that is what the question is meant to ask, it can be so stated. If it is a question whether the energy delivered originated outside of the State, that is [953] another thing, and if that is the answer to the question that is called for, that can be so stated.

Trial Examiner: He has worded it now in such a way as to make it "understandings or agreements", which would not involve the question of where the energy actually originated.

Mr. Wahrenbrock: Yes, but he has not cured the ambiguity of the phrase which he used, which is "called for". If he is going to judge what was done by what actually happened, that is, that

energy from outside of the State was actually delivered, that is one thing. If he is asking whether the contractual requirement was that it be extra-State energy, that is another thing.

Trial Examiner: I understood counsel to mean by "called for", "provides for".

Mr. Branch: Yes, sir.

Mr. Wahrenbrock: With that understanding, the question is more definite.

Mr. Branch: Perhaps I had better reframe it.

By Mr. Branch: *Q* Mr. Barney, as far as you know, has there at any time since August 25, 1936, been any contract, arrangement or understanding providing that any energy originating outside of the State of Connecticut be delivered either to the Torrington Electric Light Company or to the Connecticut Light and Power Company, by your Company, the Connecticut Power Company?

[954] Mr. Wahrenbrock: That was a rather long question, Mr. Examiner, and of considerable interest to me, and I ask that it be read back, please.

Trial Examiner: The question will be read back for the benefit of Commission Counsel.

(The question is repeated by the reporter.)

The Witness: All I can say in answer to that is that there were no agreements, written or oral, to the best of my knowledge, between the Connecticut Power Company and the Connecticut Light and Power Company which in any way provided for delivery of out-of-the-State energy to the Connecticut Light and Power Company either at Bristol or Torrington.

By Mr. Branch: *Q* I understand your answer would also apply to agreements or understandings, written or oral, between the Connecticut Power Company and the Torrington Electric Light Company, would it not? *A* Yes, it would be the same answer.

Q It was a rather long question and I wanted to be sure that your answer related to the entire question.

Trial Examiner: May I inquire at this time of counsel whether

he will find it necessary to get away before 5:00 o'clock, or whether he has made arrangements with his associates to take care of the situation so that he will be prepared to present that memorandum in the morning?

[955] Mr. Branch: Mr. Smith informs me that arrangements have been made so that it won't be necessary for me to get away before 5:00 o'clock.

Trial Examiner: Very well. We will proceed then, until 5:00 o'clock.

By Mr. Branch: *Q* I show you, Mr. Barney, what purports to be a copy of an agreement made as of June 1, 1936, between the Hartford Electric Light Company and the Connecticut Power Company, to which is attached what purports to be a copy of a letter which is from you to the Connecticut Power Company, in your capacity as vice president and general counsel of the Hartford Electric Light Company, and endorsed in behalf of the Connecticut Power Company with an acceptance by the vice president of that company.

Trial Examiner: Has Commission Counsel seen this?

Mr. Branch: No. I will show it to him.

By Mr. Branch: *Q* Are those correct copies, do you know, of what they purport to be?

Trial Examiner: I suggest you show it to counsel.

Mr. Wahrenbrock: I am sorry, I did not hear the question.

Mr. Branch: I asked him if those were copies of what they purport to be.

Mr. Wahrenbrock: Do you have copies of this, Mr. Branch?

[956] Mr. Branch: I am sorry to say that we have not. I will merely have it marked for identification and we will have copies made for you.

Mr. Wahrenbrock: I may have a copy; I am not sure.

Mr. Branch: May I proceed and offer it subject to your comparing it?

Mr. Wahrenbrock: Yes.

Mr. Branch: I believe I asked a question with regard to it.

Trial Examiner: Read the question.

(The question is repeated.)

The Witness: I cannot say from personal knowledge, except that it appears to be a photostatic copy of the original contract, and a photostatic copy of my signature in the letter looks like my signature.

Mr. Wahrenbrock: Mr. Examiner, I find that I have available four copies of what appears to be the same agreement, with additional correspondence, apparently in modification thereof, which has been filed with the Federal Power Commission, and if that will serve Mr. Branch's purpose, I think we can just put that in.

Mr. Branch: Thank you.

Mr. Wahrenbrock: It is a copy that was filed as a rate schedule with the Federal Power Commission.

Mr. Branch: Is this the same one?

Trial Examiner: I think there is some additional informa-
[957] tion on that.

The Witness: I believe they are the same ones, except the copy submitted by the Federal Power Commission Counsel has one modification on it, and then the various renewals of the agreement up to 1940.

Mr. Wahrenbrock: Mr. Examiner, inasmuch as the copy which I tender counsel is more complete, I believe it would be more desirable to use it.

Mr. Branch: Thank you. I will use the copies which Mr. Wahrenbrock has submitted to me, and I note that these also contain effective dates. In the one instance I think we disagreed as to what the Commission put in as the effective date.

Trial Examiner: I think it will be understood that those are not part of the contract but were notations made by the Commission.

Mr. Branch: Very well. I ask that this group of papers which Mr. Wahrenbrock has handed me, which consists of a copy of an agreement made as of June 1, 1936 and filed with the Federal Power Commission on November 9th, 1937, which copy consists of three pages and an amendment which is endorsed "File date

November 9th, 1937", with some other words, which I cannot read—a copy of a letter dated June 7th, 1937, filed with the Federal Power Commission November 9, 1937; a copy of a letter of May 4, 1938—the filing date apparently is September 1, 1939; and copy of a [958] letter of May 2, 1939, evidently filed with the Commission on September 1, 1939, letter dated April 22nd, 1940, evidently filed with the Federal Power Commission May 4th, 1940. I ask that that group be marked Exhibit 36 for Identification.

Trial Examiner: It may be so marked.

(The documents referred to are marked Exhibit Number 36 for Identification.)

Mr. Branch: I offer in evidence Exhibit 36 for Identification.

Mr. Wahrenbrock: No objection.

Trial Examiner: May I ask one question of the witness in connection with this, and that is whether on the letters of June 7th, 1937, May 4th, 1938 and May 2nd, 1939, the word "Superseded" has been added sideways on the letter at a later period? That is all I want to know—that they were not on the originals?

The Witness: I would assume that they were not on the original.

Trial Examiner: They are not a part of the letters, as you recall?

The Witness: No, they were not.

Trial Examiner: Is there any objection to the admission of the Exhibit 36?

Mr. Wahrenbrock: No, I am glad to have it in.

[959] Trial Examiner: Exhibit 36 will be received in evidence.

(Exhibit 36 for Identification was marked Exhibit 36 in Evidence.)

By Mr. Branch: *Q* I call attention to the recital reading as follows: "Whereas, the Hartford Electric Light Company is the owner of steam plants in the State of Connecticut which have sufficient capacity to supply The Connecticut Power Company with its primary needs, as hereinafter set forth, and also the water power plants of the Connecticut Power Company and the steam

plants of the Hartford Electric Light Company can be operated in conjunction to serve the combined loads of both companies with greater efficiency than if the facilities of each were applied primarily to the requirements of the zone system", and I want to ask, Mr. Barney, whether all of the steam plants of the Hartford Electric Light Company and all of the water power plants of the Connecticut Power Company which are referred to there are located in Connecticut? *A* Yes.

[*960*] *Q* And I call attention to clause 4 of which I am reading enough to convey the meaning but not every word: "The Hartford Company agrees to supply primary capacity to Connecticut Power Company as may be required in addition to the capacity of the Connecticut Power Company's own water power plants to carry the present agreed base primary loads of the Connecticut Power Company, in the following load centers", and then follow these names,—Middletown, Thomaston, Torrington, Housatonic Local—Falls Village, Manchester and Unionville. I am not reading the figures of the base loads. Paragraph 5 which reads in part: "The Hartford Company further agrees to furnish additional capacity as may be required from time to time by the Connecticut Company for its primary loads in the load centers set forth in Section 4."

Mr. Wahrenbrock: Mr. Examiner, I interject at this time to ask whether this is a question that is being framed by counsel, or whether he is just volunteering to read what is already in the record? If it is just a repetition of what is already in the record, I suggest that it is unnecessary.

Mr. Branch: I wish to direct the attention of the witness to this.

Trial Examiner: I rather assumed it was preliminary to a question, although it had become rather involved.

By Mr. Branch: [*961*] *Q* I will ask you whether all of the places mentioned in those load centers are in Connecticut, Mr. Barney? *A* Yes, sir, they are.

Q And the Torrington referred to there is the place which is served by the Torrington Electric Company, is it not? *A* Yes.

Q I might add this also, are there any lines between the generating plants of the Hartford referred to in that contract and the Connecticut Power Company referred to in that contract between the plants and those loads which are mentioned there—those load centers—which go outside of the State of Connecticut?

Trial Examiner: I will ask you to read that question.

[*962*] Mr. Branch: I think I can clarify that. It seems puzzling to the Examiner.

By Mr. Branch: *Q* Do the lines, the direct lines which run from those generating plants to those load centers go outside the State of Connecticut?

Mr. Wahrenbrock: Mr. Examiner, I think the Examiner's point has not yet been met. The lines aren't defined. They are already apparently in the record. They are lines which are interconnected with lines that go outside the State, and unless he defines them, limits those lines, the question is in conflict.

Trial Examiner: I think the words "direct lines" are rather indefinite there. Just what lines are you talking about?

Mr. Branch: The maps will show them. If there is any doubt, we will do it the other way. I didn't suppose there was any question about that.

By Mr. Branch: *Q* I now show you, Mr. Barney, what purports to be a copy of an agreement dated June 8, 1937, between the Hartford Electric Light Company and the Connecticut Power Company, and ask you whether that is a copy of a contract between those two companies—a correct copy.

Mr. Branch: I hand counsel a copy—I am afraid I am [*963*] neglecting the Examiner. My assistant who knows how to do these things correctly is not here.

Trial Examiner: I am afraid I have lost track of the exhibit numbers.

Mr. Wahrenbrock: I have no objection to this going in if I have an opportunity of checking.

Mr. Branch: We won't take Mr. Barney's time. If you will admit it is a copy, subject to your right to check.

The Witness: This is not a complete copy of the contract, because it hasn't got the Connecticut Power, Bristol contract, attached to it, which is incorporated by reference.

Mr. Branch: Is that in evidence, do you know?

Mr. Wahrenbrock: I am a little bewildered by the number of these things and I can't answer on the spur of the moment. I will be glad to check it, and if it will save confusion, I will check it immediately.

Trial Examiner: That might be the proper thing to do. It is a question that involves just what is in there.

Mr. Branch: To do what, sir?

Trial Examiner: To check that immediately.

Mr. Branch: These copies we have here—this original does contain it. This one doesn't have a copy of our Bristol contract. I find that that particular copy doesn't have it. Thank you for calling it to our attention. It is an omission.

[964] By Mr. Branch: *Q* I now hand you a document containing several more pages, and I ask you whether that does or not—

Mr. Wahrenbrock: Have you a copy of the document last referred to for me?

Mr. Branch: I think I gave it to you, and I think that yours did contain a copy. The one that I gave to the witness did not. I supposed they were all the same, but apparently some of them have that omission.

Trial Examiner: How many pages are there in all? If you will tell me how many there are supposed to be—this does not look as if it were complete. There are only five pages here.

Mr. Branch: No, yours is not complete either. We cheated you and the witness.

By Mr. Branch: *Q* Is that a complete copy, Mr. Barney? *A* It is a complete copy. I can't vouch as to its accuracy.

Mr. Branch: All right. Subject to your right to correct any mistakes, I would like to have that in evidence.

Mr. Wahrenbrock: Mr. Examiner, I am not sure on this short

notice that I am in a position to verify this at all. I have no reason to believe that it is not what it purports to be, and I make no objection as to the kind of copy it is.

[965] Trial Examiner: With the understanding that it will be later verified to satisfy counsel, the exhibit No. 37 will be admitted.

Mr. Branch: May I have this document which consists of eleven pages, the first five of which are numbered from 1 to 5, and the last six of which are numbered from one through six, being copy of the contract referred to. I ask that it be marked for identification No. 37.

Trial Examiner: It has already been admitted. I understood you to ask that it be admitted a while ago.

Mr. Branch: Well, this is another contract, sir.

Trial Examiner: You withdrew the one copy which was incomplete, and then sent in this other one. This is the one we have been talking about, isn't it, or do you have another one there now?

Mr. Branch: I introduced in evidence a sheaf of papers which related to various places, including Torrington. This group relates to Bristol. I presented something which the witness stated was not complete because the original had attached to it as an exhibit a copy of the contract between—

Trial Examiner: You also handed him later another one, which the witness states was correct, and which was admitted. It is admitted and is marked Exhibit No. 37.

(The document referred to was marked as Exhibit No. 37 in evidence.)

[966] Mr. Branch: I understood it is admitted in evidence.

Trial Examiner: That is correct.

Mr. Wahrenbrock: May I state at this point that the agreement of December 16, 1936, in six pages, which constitutes the last part of Exhibit No. 37, appears to conform to an agreement filed by the Connecticut Power Company, as rate schedules FPC No. 4, filing date No. 9, 1937. I make that statement for the purpose of

more ready identification by the Commission. I have not yet had any opportunity to discover the counterpart of the first part of the exhibit.

Mr. Branch: Yes. Has that part which you just referred to been put in evidence as a separate exhibit?

Mr. Wahrenbrock: I believe it is Exhibit 8 and Exhibit No. 25.

Mr. Branch: I think you are right. I think it is Exhibit 8.

Trial Examiner: Exhibit No. 8 appears to bear the same date, at any rate.

Mr. Wahrenbrock: You had better pause there, for there are two that bear that date between the two parties.

Mr. Branch: Exhibit 8 refers to the Bristol, and this thing that we are talking about refers to Bristol.

By Mr. Branch: *Q* Mr. Barney, are the contracts to which the Connecticut Power Company was a party, in regard to Torrington and in [967] regard to various plants, including—or in regard to Bristol, and in regard to various load centers, and in regard to Torrington, which have been put in evidence as Exhibits 36 and 37, still in effect as possibly modified?

Mr. Wahrenbrock: May the question be made more definite?

Mr. Branch: My point is this: These are evidently renewed from time to time, as they expire, by letter. My hurried examination of these documents would indicate that maybe the letters aren't quite up to date. Some of them apparently expired on June 16th of this year, and I want to know whether they have been continued so that they are still in effect.

The Witness: They are both in effect.

By Mr. Branch: *Q* And if they have expired subsequently to any time that is evidenced by the documents here, some letter has been signed—or something of that kind has been arranged, extending them? *A* The contract of June 1, 1936, as renewed from year to year, has already been renewed this year. So it will run until June 6, 1941.

Q 1941? *A* 1942, rather.

Q Yes. What is the main source of supply of the Connecticut Power Company under these two contracts, Exhibits 36 and 37, which relate to Bristol and Torrington, among [968] other places?

Mr. Wahrenbrock: Mr. Examiner, I am going to object to that question on two grounds. First, that it is beyond the direct examination, outside of the scope of matters opened up by direct examination. Second, that the question calls for an engineering opinion.

Trial Examiner: I think on the first point I will grant the objection. The objection is sustained.

Mr. Branch: May I have an exception?

Trial Examiner: The objection is sustained without going into the technical point. You have your exception.

By Mr. Branch: *Q* Mr. Barney, I show you a letter, what purports to be a copy of a letter, to you—from you to the Federal Power Commission, dated March 24, 1936, and ask you whether you sent such a letter to the Federal Power Commission?

Mr. Wahrenbrock: May I see a copy of the letter?

Trial Examiner: They are on the way around to you. I think perhaps before the question is answered, you will have it.

Mr. Branch: Give him copies of the others at the same time.

Mr. Wahrenbrock: Thank you. Mr. Examiner, I wish to make a statement at this time, that Commission's counsel will make no contention in this [969] case that the Commission has jurisdiction, or had jurisdiction, by reason of any transmission of electric energy during the continuance of the emergency caused by flood conditions during 1936, the early part of 1936, and if this line of inquiry is being opened up to rebut some assumption that we will make such a contention, I think the necessity therefor can be avoided. I do not mean thereby to take a position as to whether jurisdiction could be established on that basis, but I mean to say I will not attempt to do so.

* * * * * * [996]

CLARENCE W. MAYOTT,

a witness called on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Mr. Mayott, will you give your address, please? *A* My home address?

Q Yes. *A* 345 Auburn Road, West Hartford, Connecticut.

Q Your business address? *A* 410 Sheldon Street, Hartford.

Q By whom are you employed? *A* By the Connecticut Valley Power Exchange.

Q Is that a corporation? *A* It is not.

Q Will you explain what it is, just briefly, for this present purpose? *A* It is an unincorporated voluntary association of companies, to obtain the greatest overall efficiency of operations, in other words, to save the largest amount of fuel possible in the generation of power in that particular group.

Q Does it own any property? *A* It does not.

Q Does it have a bank account? [997] *A* It does not.

Q Does it pay your salary? *A* It does not—it does, indirectly, yes.

Q By whom is your salary paid? *A* My salary is paid directly by the Hartford Electric Light Company.

Q And credits and debits are made as between the members of the Association in settlement for the payments which it makes? *A* In total.

Q What is your position with the Connecticut Valley Power Exchange? *A* Manager.

Q Have you any superior in that organization? *A* The Exchange members.

Q You are responsible to the members of the Exchange? *A* To the members of the Exchange.

Q At the present time, who are those members? *A* The mem-

bers that have control for the various ones are Mr. F. L. Hunt, for the Turners Falls Power and Electric Company.

Q What is his position with that company? *A* He is vice president.

Q Vice president? *A* Vice president. Mr. Pope, vice president of the New [998] England Power, and my contact is mostly with his assistant vice president.

Q What is the name of the assistant? *A* W. R. Bell.

Q Will you continue? *A* And Mr. S. Ferguson, president of the Connecticut Power Company.

Q Mr. Samuel Ferguson? *A* Mr. Samuel Ferguson. Mr. A. D. Colvin was appointed as the representative, quite some time back, and my contact has been mostly with Mr. Ferguson for the Connecticut Power.

Q There are three at present, only three members of the Exchange? *A* Only three members of the Exchange—the Connecticut Power Company, the Turners Falls Power and Electric Company and the New England Power Company.

Q Does the Exchange at present have contractual relations with companies other than those you have named, for the purchase of Exchange power? *A* There are no contractual—

Mr. Branch: (Interrupting) Excuse me just a moment. May I have that question repeated?

(The question is read.)

The Witness: There are no contractual relations. There are certain agreements as on file with the Federal Power Com- [999] mission.

By Mr. Wahrenbrock: *Q* Under those agreements, does the Exchange receive, deliver or interchange electric energy with other companies other than those you have named? *A* Yes.

Q Will you name those companies? *A* It has an agreement with the Central Hudson Gas and Electric Company in New York State which is on file with the Federal Power Commission.

Q Its relations with the Central Hudson Gas and Electric are determined by a contract for the purchase, sale or interchange of

electric energy, are they? *A* By agreement on a day by day, and almost an hour by hour basis.

Q I do not understand the distinction you have in mind between a contract and an agreement, as you answer my questions. *A* Well, it seems to me that a contract would be something that you were held to for some length of time.

Q But there is an arrangement under which energy may be bought or sold or exchanged and paid for, and which when bought or sold or exchanged must be paid for at a price that is fixed?

Mr. Branch: I object to that as leading.

Trial Examiner: I think the question is very definitely [*1000*] leading.

Mr. Wahrenbrock: I don't mean to suggest that there is or is not.

By Mr. Wahrenbrock: *Q* I am asking you whether that is the fact, Mr. Mayott.

Mr. Branch: I object on the ground that it is still leading.

Trial Examiner: It is still leading. I would suggest that you give the witness a chance to explain the nature of the contract or agreement itself.

By Mr. Wahrenbrock: *Q* Will you do so briefly, Mr. Mayott? I know that it is on record with the Commission, and it may be put in evidence later, but I would like a brief statement of what that agreement is with the Central Hudson Gas and Electric Corporation? *A* The agreement with the Central Hudson Gas and Electric Association—

Q Is it an Association or a corporation? *A* A corporation. It is the same as the agreement between the three parties to the original Exchange. They will deliver—they deliver power on an incremental basis, whenever there are any savings to be made, by transferring it to Connecticut, and they receive power whenever there is a saving to be made by them receiving power from Connecticut. It is not on a fixed [*1001*] charge or credit basis at all. It is entirely upon the momentary value of the power at the time of the transfer.

Q When electric energy under that agreement has been delivered to the Central Hudson Gas and Electric Corporation during a given billing period, is that corporation entitled to participate in the savings of the Exchange for that billing period? *A* They participate in the savings, they participate in the savings that they are instrumental in making.

Q Will you explain the basis of their participation in the savings a little bit further? How do they participate and to what extent? *A* They participate inasmuch as the investment in that line was made for exchange purposes only, and is in no way connected with the transfer of primary energy. Any savings that are made in transfer over that line, any net savings, beyond those delivered to such companies as might be beyond, is divided between the Connecticut Power Company and the Central Hudson Gas and Electric Company.

Q Mr. Mayott, I thought I understood the basis upon which the members participate in the savings of the Exchange, but I do not yet understand clearly the basis upon which the Central Hudson participates. Will you explain first the basis upon which the three members of the Exchange participate in the savings realized by the Exchange? [*1002*] *A* The three members of the Exchange participate equally in the net savings of the Exchange after all operating and capital investment savings have been credited.

Q Are the payments made to the Central Hudson Gas and Electric Company deducted from the gross savings before there is a division of the net savings to the members of the Exchange? *A* The members of the original Exchange do not participate in any savings as are now being made to Central Hudson, because the amount of that saving is so small that it has never paid a reasonable return on—the savings have never paid a reasonable return on the investment made for that investment or purpose.

Q Who put up the investment that was involved to make the Central Hudson Gas and Electric interconnection? *A* I understand it was the Connecticut Power Company and the Central Hudson Gas and Electric Corporation.

Q And that investment was the investment in the so-called E-line from Falls Village to the New York-Connecticut State Boundary, so far as the Connecticut Power Company was concerned, was it? *A* Originally it went farther than that, I understand.

Q At the present time. *A* At the present time it is to the State line.

Q And the investment, so far as the Central Gas and Elec- [*1003*] tric Corporation is in that same E-line as it extends from the Connecticut-New York State boundary to Poughkeepsie? *A* Yes.

Q The financial settlements, then, for the exchanges between the Central Hudson Gas and Electric or with the Central Hudson Gas and Electric, are made between the Connecticut Power Company and the Central Hudson Gas and Electric Company? *A* No, they are made between the Exchange and the Central Hudson Gas and Electric.

Q But they are made on a basis of calculation which involves only the Central Hudson Gas and Electric and the Connecticut Power Company? *A* You mean the savings?

Q The payments made to those corporations with respect to those exchanges. *A* The payment of savings made over the so-called E-line are given to the Central Hudson and to the Connecticut Power Company as partial reimbursement for the investment that they have incurred in that E-line to make exchange possible between New York and Connecticut.

Q Can you illustrate that by taking a single transaction or two transactions, which would give rise to a saving, and show how that saving would be divided? *A* Well, we would assume that we might deliver power at the cost of zero to generate in New England over to Central [*1004*] Hudson, and it might cost—it might have a value to the Central Hudson as against their production over that way of $100, say, in which case, say, $60 would go to the Central Hudson and $40 would go to the Connecticut Power Company, the $60 and $40 being the ratio of the investment chargeable against exchange in the two cases.

Q In that transaction that you have used for the purpose of illustration, would the Turners Falls Company participate at all in the savings arising out of the transaction, in which it had contributed the energy? *A* No.

Q The answer is, No? *A* The answer is, No.

Mr. Branch: May I have that stricken out on the ground that it does not appear that there is any situation in which Turners Falls would supply the energy?

Mr. Wahrenbrock: I will be glad to qualify that question by a further question to the witness.

Trial Examiner: I think that you should lay the groundwork for that first.

By Mr. Wahrenbrock: *Q* For purposes of illustration which you used, Mr. Mayott, were you assuming that the energy from Massachusetts would have been contributed by the Turners Falls Company? *A* I did not make any assumptions, I just gave you an [*1005*] illustration.

Q What are the sources of zero-cost energy in exchange? *A* Oh, there have been some times when such zero power was from Falls Village and from the Western Massachusetts companies, and I believe possibly there have been some occasions when there has been some from the New England Power Company.

Q On such occasions as there have been zero-cost energy from the Massachusetts companies, has that energy been delivered to the Exchange by the Turners Falls Company? *A* May I have that question read?

(The question is read.)

The Witness: There has been some from the Turners Falls Company.

Mr. Wahrenbrock: I think that meets the objection which Mr. Branch offered.

Trial Examiner: I believe that it does. I have taken this method, Mr. Branch, of permitting it to be satisfied afterwards, because of the fact that counsel did not object to the question when it was asked, but made a motion to strike.

[*1006*] Mr. Branch: Well, it does not seem to me that there is any proof that there are instances of that, and if that is important, it seems we might find out whether there were any meters at the New York-Connecticut line that would measure in any way the power going to Central Hudson, as showing its origin.

Trial Examiner: Mr. Branch, I believe there are some statements that lead that way, and if counsel desires to question further, he can bring that out on cross-examination.

Mr. Branch: You understand I still object, and I think a motion to strike should be granted, and I object to this last question, and ask that all the questions with regard to this inquiry be stricken.

Trial Examiner: The motion is refused. An exception will be granted to the respondent.

By Mr. Wahrenbrock: *Q* Returning to the question I have been trying to develop here, the subject matter that I have been trying to develop, Mr. Mayott, what would become of the savings on the E line if there were profits arising from those transactions beyond the charges on the investment? *A* If there were charges beyond the investment it would be divided up between those parties, all the parties to the transaction. But there never has been.

Q I believe you misspoke yourself.

[*1007*] Mr. Wahrenbrock: May I ask that the answer be read back? I think you said "charges" for the word "profit".

Trial Examiner: The reporter will read the answer.

(Whereupon the last answer as above recorded, was read by the reporter.)

The Witness: I should have said "savings".

By Mr. Wahrenbrock: *Q* When you are referring to parties there, you were referring to the Central Hudson Gas Electric Corporation and the Connecticut Power? *A* No, I was referring to the Central Hudson Company and the Connecticut Valley Exchange.

Q And by the Exchange you mean— *A* The Connecticut Valley Power Exchange.

Q And you mean the three members you have named? *A* The three members.

Q Then is the reason for the different arrangement in case of the transaction over the E line the fact that the savings aren't enough to pay the charges on the investment? *A* In principle there is no difference between those transactions and the rest of the exchange.

Q Are there other companies with which energy transactions are carried on by the exchange? *A* Not directly.

Q Will you explain what you mean by not directly? [*1008*] *A* The Central Hudson Gas & Electric Company have other corporations which they are connected to, and the New England Power has a number of connections which they are connected to.

Q You haven't explained the relation of the New England Power Company to the exchange? *A* The New England Power Company is a member of the exchange.

Q Excuse me. I was in error. A little bit ago you mentioned the Western Massachusetts Company. *A* If I mentioned the Western Massachusetts Company, I was thinking of Turners Falls. The Turners Falls Power & Electric Company is one of the Western Massachusetts companies.

Q Well, will you explain how energy transactions are carried on where energy is derived from other companies of the Western Massachusetts group than the Turners Falls Company? *A* That is entirely taken care of by the Turners Falls Company. As far as the exchange is concerned, they don't enter into any of the transactions between the Turners Falls Company and the other members of the Western Massachusetts companies. As far as we are concerned, they are a unit we have nothing to do with. They are internal—

Q I would like to ask one or two questions to get that clear. I think you realize that while it is very familiar to you, this exchange operation is novel enough to those of [*1009*] us who don't deal very much with it, that it is a little difficult to grasp at first. Perhaps an illustration is a good way to develop what I would

like to find out. Can you give me the name of some generating plant owned by one of the Western Massachusetts companies other than the Turners Falls Company from which you sometimes get energy. The Cabot plant is owned by the Turners Falls Company? *A* Yes.

Q What other plants do you sometimes call on up there? *A* Well, there is the plant at Springfield.

Q Who is that owned by? *A* By the United Electric Light Company.

Q Is that one of the Western Massachusetts companies? *A* Yes, one of the Western Massachusetts companies.

Q When Springfield has capacity available which is not required for any of its own requirements, and can produce energy at a lower incremental cost than the lowest incremental cost available among members of the exchange, how does the exchange avail itself of that?

Mr. Branch: I object to that on the ground that it doesn't appear that that occurs.

Trial Examiner: Will you first lay the groundwork for your question?

Mr. Wahrenbrock: Yes.

By Mr. Wahrenbrock. [*1010*] *Q* Mr. Mayott, are there occasions on which savings can be realized among the members of the exchange by calling upon the Turners Falls Company to deliver electric energy generated from the Springfield plant? *A* I was trying to recall any such occasion in recent years, but I don't recall it now.

Q Well, you do at times get energy from the United Electric Light, do you not? *A* I can't recall of any such instances in recent years.

Q Well, do you occasionally receive electric energy from the Turners Falls Company that is generated at the Gardners Falls plant?

Mr. Branch: I object. I don't know that the witness knows

about that. Unless he knows that, I think it ought to be made clear that he must be restricted to what he knows.

Trial Examiner: Apparently the witness talks as if he knew. He claims to be the head of the exchange and should know where the power comes from.

Mr. Branch: My understanding is that all his duties call upon him to do is to make calculations and settlements with the Turners Falls, the New England Power, and the Connecticut Power, and also the Central Hudson. I don't understand that he has any duty to go any further than that, and if my understanding on that is correct, it seems to me there is no basis for asking him this question.

[*1011*] Trial Examiner: His knowledge is being explored here, and I think he may answer as to what he does know.

Mr. Branch: Yes, but I think it should be made clear that he is testifying only as to what he does know himself.

Trial Examiner: That may be. I don't think he has indicated he didn't know here from the nature of his answers.

Mr. Branch: I didn't so understand them, sir. I object to the question on the grounds I have specified.

Trial Examiner: It seems to me the question asked him—if he doesn't know certain things, then the only answer he can make is to that effect. He has answered as if he had full knowledge. The objection will be overruled.

By Mr. Wahrenbrock: *Q* Will you answer my question, Mr. Mayott? *A* Will you repeat the question?

Trial Examiner: The reporter will read the question to the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: That is a part of the Turners Falls system, whose load I am not familiar with, and I couldn't tell you whether there is any power ever received from that particular plant.

By Mr. Wahrenbrock: [*1012*] *Q* I am still trying to get an example of an instance in which the energy comes from the plant

of some other company than the Turners Falls Company, in order to ascertain how the financial settlements are made for the savings growing out of those exchanges, and perhaps the easiest way will be for me to refer to this photostat—

Trial Examiner: Has the respondent's counsel had an opportunity to inspect that?

Mr. Wahrenbrock: Respondent's counsel has furnished me with this copy.

Trial Examiner: I suggest that counsel be given an opportunity to know what document you are talking about.

Mr. Wahrenbrock: I was going to identify it.

Trial Examiner: Show it to him before you identify it.

Mr. Wahrenbrock: I think he has a copy.

Mr. Branch: I don't know what he is talking about. I take it that you don't object to my seeing it.

Mr. Wahrenbrock: I certainly don't, but you have copies, or your client has access to them.

Trial Examiner: I think that is immaterial, in view of the fact that respondent's counsel has a right to know what is being shown to the witness, and not necessarily be forced to study his own files in order to be sure.

(The documents were handed to Mr. Branch.)

Mr. Branch: You haven't a magnifying glass, have you?

[*1013*] Mr. Wahrenbrock: No, I do not have. I don't require the assistance of one, I am glad to say.

Mr. Branch: You are very lucky. Did you say we furnished you with this, Mr. Wahrenbrock?

Mr. Wahrenbrock: I am considering, in order that I may recall the details.

Mr. Branch: This is nothing that appears to come from us.

Mr. Wahrenbrock: You are right in asking the question, Mr. Branch. The log sheets which your company furnished were the log sheets of the Falls Village plant. The log sheets of which those are photostats were furnished to us by the Connecticut Valley Power Exchange. I will be glad to read it to you.

Trial Examiner: I would suggest that this would be a pretty good time to take a five-minute recess.

(At this point a short recess was taken, after which the hearing was resumed.)

[*1014*] Trial Examiner: The hearing will be in order.

By Mr. Wahrenbrock: *Q* Respondent's Counsel has now returned, and I show the witness a photostat of the Connecticut Valley Power Exchange—load control supervisor's log sheet, for Sunday, May 2nd, 1939, being a photostat which was made for me by arrangement with the Connecticut Valley Power Exchange, and I call the witness's attention to the third general column on that photostat, which is headed "Hydro-Generation", and I call his attention to the headings under that general heading,—the first one is Cabot, the next one is Number 1 Station, T. F., the second one is Gardner's Falls, and I may say that abbreviations are used, which I will not take time to spell out. The next one is Cobble Mountain, the next one is United Electric Light Company No. 2 Station, the next one is the United Electric Light Company Number 3 Station, the next one is Hartford Electric Light, Miscellaneous, the next is Falls Village. There are some more, but there are no entries under them until we come to the totals at the end of that division of the log sheet. Now, Mr. Witness, directing your attention to those I have named, I will ask you what those headings indicate? *A* They indicate the generation at that particular hour at that particular station.

Q To supply the electric energy which was received by the Exchange? [*1015*] *A* To supply the total. First, of course, it would go to their own system.

Q Have you completed your reply? *A* Yes.

Q What do the figures under those headings for any particular hour indicate? *A* Only the generation at that particular station.

Q What relation had those figures to the operation of the Connecticut Valley Power Exchange? *A* Merely that that was the most efficient operating load for the whole Exchange for that particular period.

Q Now, in such a case as is shown by the first hour for that day, where the figure of 36 appears under United Electric Light Company No. 2 Station, what does that refer to? *A* That is the load of No. 1 Hydro Station of United Electric Light Company at that particular time.

Q The No. 2 United Electric Light Company at that particular time. *A* The No. 2 United Electric Light Company Station at that particular time.

Q Is that the total load on that station during that hour? *A* That is the total load on that station. That is the integrated kilowatt hours for the hour between 12:00 and 1:00 on that particular day.

[*1016*] *Q* May that station during that hour have also been supplying other energy to other loads? *A* No.

Mr. Branch: Mr. Wahrenbrock, have you another copy of that that I can see? It is so difficult to see it anyway, and I would not like to interfere with you.

Mr. Wahrenbrock: Would you like to look at it? There is only one copy available. I have no other copy.

Trial Examiner: Are you going to be in a position to get another copy for the record?

Mr. Wahrenbrock: This is just to take an illustration at this point, Mr. Examiner. I think the facts appear on the record clearly enough as to what is being referred to.

Trial Examiner: It is rather a complicated proposition to get it in the record with relation to this document which you are referring to.

Mr. Wahrenbrock: I have asked the witness questions, which I think bring it out and explain it.

By Mr. Wahrenbrock: *Q* Does that "36" mean 36,000 kilowatt hours? *A* No, it means 3,600 kilowatt hours.

Q 3,600 kilowatt hours? *A* There is a dot in there. It is very indistinct. They don't always put it in, but that is 3,600 hours.

Q The columns read in thousands, and that is 3.6 thou- [*1017*] sands? *A* Yes.

Q How were financial settlements for that energy made between the Turners Falls Company and the United Electric Light Company? *A* That is entirely within the Western Massachusetts companies themselves, and I have no knowledge.

Q At what incremental cost figure would that energy be accounted for by the Connecticut Valley Power Exchange?

Mr. Branch: I don't know that it appears that it would be accounted for at all. Until that appears, I object to the question.

By Mr. Wahrenbrock: *Q* Would the receipt of 3,600 kilowatts as shown by the instances to which I have referred, be accounted for in the operations of the Connecticut Valley Power Exchange?

Mr. Branch: I don't understand that that was a receipt by the Connecticut Valley Power Exchange, so I object to the question as apparently containing an assumption which is not so. It certainly is not shown.

Mr. Wahrenbrock: All right.

By Mr. Wahrenbrock: *Q* I will ask if the sub-column under "Hydro-Generation" which is headed "Total Hydro", and which for that hour and day is shown to be 66.5, if that represents the total energy [*1018*] receipts of the Connecticut Valley Power Exchange derived from hydro-electric sources? *A* Not delivered to the Connecticut Valley Power Exchange. That is the total generation for the hydro-stations of members of the Connecticut Valley Power Exchange.

Q What is the purpose of showing that on this log sheet? *A* To assist in scheduling of the load and keep track of the load.

Q Assist how in the scheduling of the load and keeping track of it? *A* Just what do you mean?

Q What is the purpose of putting it there; what do you do with the figures? *A* We use this as a record as to what has been done, and to assist us in future days in scheduling the load so that there is sufficient capacity on the total system to carry the load and carry it in the most efficient manner.

Q That is pretty general, and I would like to get it a little bit clearer on one or two details of this. I would like to ask you how

that figure enters into the accounting among the members of the Exchange at the end of the month. *A* That particular figure does not.

Q Is that particular figure included in a total for the day and the totals for the day included in a total for the month [*1019*] which enters into the settlement among the members of the Exchange? *A* No.

Q Does the total under the heading that I have previously referred to, United Electric Light Company No. 2 Station, the total at the bottom of the column for the day, enter into the accounting calculations of the Exchange in settlement with its members at the end of the month? *A* No.

Q In considering the receipt of electric energy during the first hour for the day to which we have been referring, does the incremental cost of that 3,600 kilowatt hours of electric energy enter into the accounting of the Connecticut Valley Power Exchange with its members? *A* Only in so far as that particular figure might affect the total generation by hydro. In itself, it does not.

* * * * * * [*1026*]

By Mr. Wahrenbrock: *Q* When the incremental cost of the electric energy which the Turners Falls Company delivers to the Exchange is a particular amount, is that the amount which is taken into account by the Exchange in calculating the savings of the Exchange from that transaction?

Mr. Branch: The same objection.

Trial Examiner: I think you are still dealing with the question not of facilities but of distribution of costs.

Mr. Wahrenbrock: Mr. Examiner, this is all in the course of establishing what this unincorporated Exchange, which apparently is not a legal entity at all, is, and if it is a method of keeping books, I believe that I should go in at least to the first step in how these savings are calculated, which is the raison d'etre of the Exchange.

The Trial Examiner: You may examine as to the purpose of the

Exchange, if that is what you have in mind. Is that what your question leads to—the purpose of the Exchange?

Mr. Wahrenbrock: That is what I have been trying to frame it to reach. I may not have succeeded as well as I should.

Trial Examiner: For that purpose I will permit the inquiry.

The Witness: May I have the question repeated?

(The question is repeated.)

[*1027*] The Witness: That is only one part of the transaction.

By Mr. Wahrenbrock: *Q* Yes. That is— *A* That is the incremental cost of the power that they deliver to the Exchange at that particular time.

Q Yes. That incremental cost which is taken into account by the Exchange in calculating the savings from the receipt of that energy and its delivery is based, so far as its receipt is concerned, upon the incremental cost of the generation of that electric energy? *A* Upon the incremental cost of the generation of that energy.

Q Regardless of whether it is generated by the Turners Falls Company. *A* That is the incremental cost, wherever it is generated for the Exchange.

Q And the calculation of the savings by the Exchange depends upon a knowledge of the incremental cost of generation of the energy, doesn't it?

Mr. Branch: The same objection, and also that it is leading.

Mr. Wahrenbrock: All right; I will turn it around to obviate that.

By Mr. Wahrenbrock: *Q* Then, does the calculation of the savings by the [*1028*] Exchange depend upon a knowledge of the incremental cost of generation?

Mr. Branch: I think it is still leading and subject to all the same objections.

Trial Examiner: I think it is largely cured. To a certain extent questions must be rather in that form.

Mr. Wahrenbrock: I think it has been established by the testimony already in.

Trial Examiner: I think it is in line with the testimony already

given. The witness may answer the question, and note an exception for the Respondent.

Mr. Branch: Exception.

By Mr. Wahrenbrock: *Q* Do you have the question in mind, Mr. Mayott? *A* I would like to have it read.

Trial Examiner: The question will be read for the benefit of the witness.

(The question is read.)

The Witness: It does.

By Mr. Wahrenbrock: *Q* What are your duties as Manager of the Exchange? *A* To coordinate the operation of the various members of the Exchange, to see that the most economical generation of power is carried out, to oversee the calculations necessary to [*1029*] arrive at billings as between the companies, for the transfer of power, and to act as a general coordinator between the companies for all purposes of operation.

By Mr. Wahrenbrock: *Q* Do you supervise or conduct the making of studies to determine or to verify the incremental costs of generation at particular plants, under particular conditions?

Mr. Branch: It is understood that my objection goes to this whole line of inquiry?

Trial Examiner: The objection is overruled and the witness will be permitted to answer the question.

Mr. Branch: And is it understood that my objection applies to this whole line of inquiry, without my continual interruption?

Trial Examiner: It is.

The Witness: May I have the question repeated?

Trial Examiner: The question will be read.

(The question is read.)

The Witness: I have nothing to do with the individual operation of any of the plants.

By Mr. Wahrenbrock: *Q* I so understand, but that was not my question. *A* The individual companies furnish me with all operating data, and any other data that might be pertinent from which I might arrive at the various costs, and any studies made are en-

tirely in coordination with the individual companies,—the [*1030*] men in the individual companies who have that particular duty.

Q From data which is made available to you by members of the Exchange, do you make studies to determine incremental costs of generation at particular plants, under particular conditions? *A* Yes, we do.

Q And do you keep current information on that subject? *A* We do.

Q And what do you use that information for? *A* In arriving at the incremental cost of the power transferred to and from the Exchange by the individual companies.

Q Yes. And what do you use your information as to that incremental cost for? *A* Also in scheduling the loads on the individual stations, in coordination with the dispatchers of those individual companies.

Q Now, will you explain your duties in that connection? *A* To make a schedule out each day as to the most efficient combination of generation, and then pass it through to the dispatchers of the individual companies, whose duty it is to either accept or reject the schedule as given. If they are agreeable, they will follow this scheduling, if they are not, they will say so, and they have the ultimate decision as to whether it shall be done or shall not be done.

[*1031*] *Q* When you say that if they decide to do so, they follow the schedule, what do you mean by "follow the schedule"? *A* They will load the station up as we recommend.

[*1032*] *Q* Does the schedule which you recommend indicate the stations which are to be loaded during particular hours? *A* It does.

Q What is the object of such a schedule? *A* The object of such a schedule is to coordinate the operation, the greatest or the maximum number overall efficiency of the generation.

Q I am sure that is—well, I will say this, that I am not sure that I personally, as a layman, understand the implications of coordination. Does that mean that the connected loads are served

from the most efficient available generating plants at all times? *A* The most efficient combination at all times.

Q And the energy from the most efficient plants, generating plants, acting in combination, is used to supply the loads at all times? *A* Essentially, yes.

Q Is there some qualification or something wrong with my statement? *A* There is a qualification. I might put it this way, that the most efficient station in one end of a system might not be the place to generate for some place on the other end of the system, where you have got to transfer it.

Q The cost of transferring the energy from what would otherwise be the most efficient station to the load has to [*1033*] be taken into account? *A* It does.

Q And what does that cost include? *A* All the losses from the line, and all the other losses from the station to the point of the load.

Q Does it include toll? *A* The toll?

Q Toll. *A* Coal?

Q No, the toll—t-o-l-l, on the CP lines? *A* No.

Q It includes energy losses in the lines and transformers? *A* All energy losses.

Q What are the energy losses? Where do they occur? *A* In transformers and lines.

Q And those—the cost of those energy losses has to be taken into—do the cost of those energy losses have to be taken into account in determining whether a particular generating plant should be called upon to supply a particular load?

Mr. Branch: May it please the Examiner, I haven't wanted to interrupt while it seemed to me the questions were in the scope of the last ruling of the Examiner. It seems to me now this certainly is getting beyond it, and is getting back into the kind of questions as to which the objection was [*1034*] sustained.

Trial Examiner: I think we are still dealing with facilities, and not the billing here, and the objection will be overruled.

By Mr. Wahrenbrock: *Q* Do you have the question in mind? *A* May I have it repeated, please?

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: Yes.

By Mr. Wahrenbrock: *Q* The result of that kind of operation which is carried out under your direction is that the efficient combination of generators—the most efficient operation of generators is used so as to cause a flow of energy from one system to another, when that will reduce their joint costs. *A* I will ask you to repeat that, please.

(Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: It seems to me that that question is ambiguous.

Mr. Wahrenbrock: I have not framed my question as I intended it to be.

By Mr. Wahrenbrock: *Q* The presumption is that energy flows back and forth [*1035*] between the systems when it is to the mutual advantage of the system to do so? *A* It is. It does.

Q How long have you been manager of the Connecticut Valley Power Exchange? *A* Since 1925.

Q When was the first Connecticut Valley Power Exchange initiated? *A* In 1925.

Q And have you been the manager from the beginning? *A* From the beginning.

Q Was the Connecticut Light and Power Company ever a member of the Connecticut Valley Power Exchange?

Mr. Branch: Excuse me. I didn't understand that question.

Trial Examiner: The reporter will read the question.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: It was.

By Mr. Wahrenbrock: *Q* At what time? *A* At what time?

Q Yes. *A* Or what date?

Q Between what dates? *A* From, I believe it was 1928 till 1935.

[*1036*] *Q* During the time it was a member of the exchange, who were the other members of the exchange? *A* The Hartford Electric Light Company and the Turners Falls Power & Electric Company.

Q Was the plan of operation of the exchange during that period of time substantially as you have just described it? *A* The basic principles of the exchange have remained the same since 1925.

Q Has the Exchange been in continuance—has the Exchange been in existence at all times since 1925?

Trial Examiner: This is somewhat of a new line of questions. I would like to know whether the objection persists at this point?

Mr. Branch: Yes, sir, it does. It seems to me this is going way beyond any issue in this case, as to what was done at that ancient period.

Trial Examiner: The Examiner states—I believe the witness's answer was not entirely clear a while ago as to the end of the time. He spoke of 1935. Now, that brings it within—unless that is clarified, that brings it within the time limit, if that is what counsel has in mind.

Mr. Wahrenbrock: I think that is a very good suggestion.

By Mr. Wahrenbrock: *Q* Are you able to fix the date of the termination of [*1037*] the Connecticut Light and Power Company's membership in the exchange more definitely? *A* August—

Mr. Wahrenbrock: Mr. Examiner, I am willing to withdraw that question, and instead of asking for what may be a legal conclusion as to the effect of a contract arrangement, I am going to ask—

By Mr. Wahrenbrock: *Q* I am going to ask, if you will, to fix the date when the Connecticut Light and Power Company ceased to deliver or receive electric energy as a member of the exchange.

Mr. Branch: Just a minute, please. May I have the question read?

Trial Examiner: Exception will be noted for the respondent.

* * * * * *

(Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: You may answer the question.

The Witness: I would place that as on the 24th of August, 1935.

By Mr. Wahrenbrock: *Q* And are you able to fix the hour? *A* I am afraid I haven't the hour here.

Q Mr. Mayott, I am going to show you a typewritten copy furnished me by Mr. Barney, of certain excerpts from Connecticut Valley Power Exchange Load Control Supervisor's Report, Saturday, August 24th and Sunday, August 25th and [*1038*] Tuesday, August 27th, 1935, and I ask you if by referring to that or to any papers in your possession you are able to refresh your recollection and state at what hour the Connecticut Light and Power Company ceased to receive or deliver electric energy to or from the Exchange? *A* From this it would be at 2:22 P.M. August 24th.

Q And you how do you fix that time? Excuse me. Did I understand you to say August 24th? *A* August 24th.

Q And how do you fix that time? *A* On this excerpt from the Connecticut Valley Power Exchange load control supervisor's report, for Saturday, August 24th, 1935, Daylight Saving Time, there is this note:

> "No. 1 C.P. Line was cut away from New Britain Tap at 2:22 P.M."

It means that some time previous to that they had opened their switches.

Q And what does it mean "No. 1 C. P. line was cut away from the New Britain tap"? *A* It means that there was a distinct—I will give you my interpretation of that, as this is a telephone conversation. It means to me that the line had been definitely opened, the transmission line had been definitely opened at that particular place.

Q From the C. P. No. 1 line? [*1039*] *A* From the C. P. No. 1 line.

Q Was the New Britain tap of the Connecticut Light and Power Company disconnected from the C. P. No. 2 line? *A* Undoubtedly both oil switches were opened at that time—previous to that time.

Q Did other members of the Exchange continue to operate as an Exchange after that? *A* Yes, until the next day.

Q Did they cease to operate as an Exchange on the next day? *A* They did.

* * * * * *

Q Did the Connecticut Light and Power Company thereafter ever participate in the operations of the Exchange?

* * * * * * [*1040*]

The Witness: After the opening of all of the State lines in what was considered to be a satisfactory manner to all concerned, the Connecticut Light and Power again connected up with the Connecticut Power Company and coordinated their operations with the Connecticut Power and the Hartford Electric Light Company until the emergency in 1936.

By Mr. Wahrenbrock: *Q* Then what happened? *A* You mean at the emergency?

Q Yes.

* * * * * * [*1041*]

Mr. Wahrenbrock: I am not interested in making the contention, if the Examiner please, that their acts during the period of the emergency, whatever that was, as being a basis for jurisdiction, but I do want to lay the basis of whether outside of the period of the emergency, they were ever afterwards participating in the Exchange, and I therefore have to define the period of the emergency, to that extent, at least. I am not sure that it will actually do that.

Mr. Branch: I object to this question and suggest that that purpose could be achieved by asking whether after the end of the

emergency, at any time with interstate connections, the Connecticut Light and Power Company was ever a member of the Exchange.

* * * * * *

Trial Examiner: I think that the suggestion of counsel for the respondent would require a further explanation as to the witness's understanding of the end of the emergency. That is the great difficulty on that score. I think to save time, and as any immaterial parts may be discarded by the Examiner in his study of the testimony and by the Commission, I think under the circumstances it might be well to let the question be answered.

* * * * * * [*1042*]

Trial Examiner: Exception will be noted for the respondent.

* * * * * *

The Witness: The emergency is quite a complicated and long thing to explain. When the emergency occurred, all questions of exchange had to be thrown overboard.

By Mr. Wahrenbrock: *Q* Can you give me the dates of the Connecticut Light & Power Company's interconnection at New Britain after the disconnection to which you have referred, on August 24th?

Mr. Branch: May I have the question read while the witness is looking over his notes?

Trial Examiner: The question will be read for the benefit of counsel.

(The question is repeated.)

The Witness: On the excerpts from the Connecticut Valley Power Exchange Load Control Supervisor's report for Tuesday, August 27th, 1935, Daylight Saving Time, there is this item:

> "1:07 P.M. No. 2 C. P. line Point 12 to 474 out of service to reconnect the tap line at New Britain."

[*1043*] That means that it was reconnected some time after 1:14.

By Mr. Wahrenbrock: *Q* May I interrupt you to ask what Point 12 is? *A* That is the switching point of the Connecticut Power Company.

Q The switching point at which what branch line is tapped to the main line of the Connecticut Power Company? *A* To the main lines from Hartford.

Q Isn't Point 12 the point at which the Middletown Branch Line taps C. P. 1 and C. P. 2? *A* Well, it is a switching point for the lines going west and the lines going to Hartford, and the lines going to Middletown.

Q And what is Point 474 or Tower 474? *A* Tower 474 is another switching point at Bristol Mountain. Incidentally, I am not an expert on the construction of the C. P. Company's system.

Q Is Bristol Mountain the point from which the branch line to Bristol leaves the C. P. 1 and C. P. 2 lines? *A* I believe it is.

Q I just wanted that explanation inasmuch as there was that language in there. Will you continue with the answer you were giving? *A* I thought I had finished.

Trial Examiner: Does the witness desire his answer read back to him?

[*1044*] The Witness: Yes.

Mr. Wahrenbrock: And the question too, please.

Trial Examiner: The Reporter will read the question and the answer of the witness.

(The record is read.)

By Mr. Wahrenbrock: *Q* Some time within a few hours after that? *A* Within a few hours.

Q Was it subsequently disconnected again?

Trial Examiner: May I interrupt for a moment? Does the record show that that was 1935?

By Mr. Wahrenbrock: *Q* It was 1935, was it, Mr. Mayott? *A* It was 1935. I thought I gave that.

Trial Examiner: I just wanted to be sure.

[*1045*] *Q* Was the connection with the Connecticut Light and Power Company subsequently discontinued again? *A* In 1936.

Q Do you have the date of that? *A* In the excerpts from the Connecticut Valley Power Exchange, load control supervisor's report, for Thursday, May 28, 1936, Daylight Saving time—I will have to correct that. It was for Friday, May 29, 1936, Daylight Saving time, there is this item: "8:31 A.M., separating from Connecticut Light and Power Company, on account of Federal Utility Act."

Q What did you understand that to mean? *A* Only what it says.

Q Was the Connecticut Light and Power Company connection at New Britain with the Connecticut Power Company's lines subsequently restored? *A* I beg your pardon. May I have that again?

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: Not in 1936.

* * * * * * [*1047*]

By Mr. Wahrenbrock: *Q* In the operation of the Connecticut Valley Power Exchange, does the exchange schedule or direct the operation of [*1048*] the switching facilities at South Meadow? *A* It does not.

Q Does it submit a schedule to the Connecticut Power Company for the operation of those switching facilities? *A* It does not.

Q By whom is the operation of those switching facilities controlled? *A* By the load dispatcher of the Connecticut Power Company, under the direction of the Connecticut Power Company.

Q Where is the load dispatcher of the Connecticut Power Company—where does he operate—where is his office? *A* At the South Meadow station.

Q At the South Meadow station? *A* At the South Meadow station.

Q The South Meadow station of what company? *A* The South Meadow station of the Hartford Electric Light Company.

Q Is the load dispatcher of the Connecticut Power Company the same individual who is a load dispatcher of any other company? *A* I believe he is.

Q What other company?

Mr. Branch: I don't see what possible bearing that has on this, unless it is the Connecticut Power—Light and Power Company, which I am sure it isn't. It seems to me the [*1049*] question "Has he any connection with the Connecticut Light and Power Company"—

Trial Examiner: I think it is material if he is connected either with the Connecticut Light and Power Company or with the exchange.

Mr. Wahrenbrock: Is the objection sustained, Mr. Examiner?

Trial Examiner: It is in the present form of the question, yes.

By Mr. Wahrenbrock: *Q* Do you, as manager of the Connecticut Valley Power Exchange, keep yourself informed as to whether the CP-1 and CP-2 lines are in service during normal operations? *A* Yes.

Q I have been using the term "CP-1" and "CP-2", which is a company term. Will you describe what is meant by CP-1 and CP-2 lines? *A* Those designate certain transmission lines of the Connecticut Power Company.

Q Are they indicated on this Exhibit No. 38 for Identification? *A* Yes.

Q Will you show—will you point out where those CP-1 and CP-2 lines are shown on Exhibit No. 38 for Identification? *A* They are near the top of the sheet, shown running between the South Meadow substation of the Connecticut [*1050*] Power Company to their Falls Village generating station.

Q Is the South Meadow substation of the Connecticut Power Company the portion of this diagram that is indicated by the wording "Hartford South Meadow"? *A* I believe it is.

Q During normal operation of the exchange, are you familiar with the connections in the Connecticut Power Company substa-

tion? *A* We would know in a general way what they are. We have no supervision and no control over them.

Q Are both CP-1 and CP-2 lines used during normal operations? *A* I believe they are.

Q On this Exhibit No. 38 for Identification, in the substation which is marked "Hartford South Meadow", there is shown in the lower right-hand corner of the dotted line, which I take it indicates the area, or the boundary of the sub-station a transformer by the usual symbol for a transformer, and a notation, "7500 KVA self-cooled, 12,000 KVA forced cooled". Do you—

Mr. Branch: Wait just a minute. I don't follow you.

Trial Examiner: I suggest that Commission counsel suspend until respondent's counsel gets a little technical advice.

Mr. Wahrenbrock: I can appreciate the need for technical advice, having relied on it myself so heavily.

[*1051*] Mr. Branch: I am ready.

By Mr. Wahrenbrock: *Q* Do you see the transformer to which I am referring? *A* I believe I do.

Q I now wish to refer to two other transformers which are vertically directly above the indication of the transformer to which I have just referred, and—do you see the two additional transformer diagrams to which I refer? *A* I believe I do.

Q How is the circuit to the lowest of those three transformers designated? How do you identify it? Does it have a number? *A* I don't know as I understand your question on that.

Q Is that lowest transformer on circuit 124?

Trial Examiner: I think counsel will clarify the record if he will say lower on the diagram or whether he means—

By Mr. Wahrenbrock: *Q* I mean the one in the right-hand lower corner of the South—the Hartford South Meadow sub-station, on the diagram? *A* There are some numbered designations, but I wouldn't attempt to give you them from memory. I know they have some numbered designations for that particular—

Q You are familiar with the relative location of those three transformers, are you? [*1052*] *A* Yes.

Q And in general you are familiar with the circuits in which they operate? *A* In general, yes.

Trial Examiner: It seems to me, Mr. Wahrenbrock, you have material here in which some of this detail you are asking the witness might better be brought out by an employee of the Connecticut Power Company.

Mr. Wahrenbrock: I think we may be able to get entirely enough—in fact, I am sure we will be able to get enough for the purpose of further questions I have to put to the witness. I do propose to ask the more detailed questions of the Connecticut Power Company officials.

Trial Examiner: All right. You may proceed.

By Mr. Wahrenbrock: *Q* In the normal operation of the Exchange, are all three of those transformers in operation? *A* I believe they are.

Q Do you, in the operation of the Exchange, take into account the energy losses in those transformers? *A* In the transfer of energy?

Q Yes? *A* Yes.

Q In the normal operation of the Exchange, is the maximum economy achieved by the operation of those three [*1053*] transformers in parallel? *A* Possibly I might correct that earlier statement by saying that maximum reliability is also always taken into account in all of our operations, and that maximum reliability would be a determining factor in taking out any transformers to make savings.

Q Then do I understand from that that during normal operations, the three transformers are operated in parallel, and unless one of them is out of repair or has failed or is out of service? *A* I believe so.

Q In determining the economy of transmission of energy for the purposes of Exchange operation, what allowance do you make for energy losses in these three transformers?

* * * * * * [*1054*]

The Witness: We make no allowance for losses that would

occur if there were no Exchange transactions. We only make allowances for additional expenses incurred by Exchange transfers.

By Mr. Wahrenbrock: *Q* Yes. When there is an Exchange transfer, what allowance do you make, if any, for energy losses in the transformers? *A* I believe the only additional losses would be some copper losses.

Q What do you mean by "copper losses"? *A* Resistance losses caused by transfer of power over [*1055*] the transformer.

Mr. Branch: I did not hear the answer; may I have it read?

Trial Examiner: You may.

(The answer is read.)

By Mr. Wahrenbrock: *Q* That is resistance losses only. *A* The transformers would have to be in operation all the time, regardless of whether there was exchange or not.

Q Do I understand—this is technical, and I do not mean to lead, because I would be the last one in the world to lead here, because I would not know how to; but I want to know if the losses, other than the resistance losses, are negligible?

Mr. Branch: With that degree of modesty which is so characteristic of Mr. Wahrenbrock, I can hardly make objection to the question.

Trial Examiner: In view of that fact, the question will be permitted.

The Witness: I am afraid you are getting into a question of transformers and relative values, that I am not prepared to qualify on.

By Mr. Wahrenbrock: *Q* What I am trying to find out is whether, in the operation of the Exchange, when there are energy transactions through the transformers, in your determination of economical [*1056*] operation, you make any allowance for energy losses in these transformers? *A* We take all losses into account in determinations of all transfers.

Q What allowances do you make for energy losses in these

transformers? *A* The total losses when you are determining what the transfer will be.

Q What are the amounts of such losses in these transformers? *A* I am not prepared to say.

Q I would like to make a call for the witness to refresh his recollection over the week-end, as I did on a previous occasion. A little while ago you testified that in scheduling the operations of the Exchange—and I am sure you will correct me if I do not state this accurately—I state it from recollection, as I do not have the transcript before me,—in scheduling the operations of the Exchange, you took into account energy losses of transformers and transmission lines in determining whether a given source of energy should be called upon to supply a given load.

Mr. Branch: I object to that. That seems to be not only leading, but also going back into the very type of matter that the Examiner ruled would not be permitted now.

[*1057*] Trial Examiner: I think he was just making some statement as to what he took into account.

By Mr. Wahrenbrock: *Q* Do you recall stating that you took into account transmission line and transformer losses in scheduling the operations of the Exchange?

Trial Examiner: This has to do with operations, and not billing. It is not within what the Examiner ruled against.

Mr. Branch: Please note my exception.

Trial Examiner: Your objection will be noted and the objection is overruled. So far, I think we have merely a statement. Now, what do you propose to follow it with?

Mr. Wahrenbrock: I just am asking the witness whether he recalls that testimony.

The Witness: May I have the question read?

Trial Examiner: The question will be read back for the benefit of the witness.

(The question is read.)

The Witness: I did.

By Mr. Wahrenbrock: *Q* If there are losses of any significance in these transformers, they must be taken into account then in the operations of the Exchange? *A* They must, yes.

Q Can you determine from the records which are available [*1058*] to you, the allowances made for losses in these transformers? *A* I would have to go quite far back, because they are all used in arriving at the station results, and they are a part of that, and I would have to go back into those original calculations. Please do not ask me to get that by Monday.

Q From the same source, you could obtain the data as to the allowances made for energy losses in the two auto-transformers shown in the same substation on the diagram? *A* I am not sure how those have been handled in detail. They are part of the line.

Trial Examiner: I understood you wanted this witness to produce some information by Monday, or see whether he could furnish some information. I would like to clarify this point and complete the session.

Mr. Wahrenbrock: That is what I would like to do, Mr. Examiner. May I have the last statement made by the witness read?

(The record is read.)

By Mr. Wahrenbrock: *Q* Mr. Mayott, is it reasonable to ask you if you can have someone early Monday morning determine for you the transformer losses of each of these three two-winding transformers and the two auto-transformers, which are taken into account? *A* I would have to take that up with the Connecticut Power Company. They have the original data.

[*1059*] Trial Examiner: It seems to me it would be a great deal more practical proposition, Mr. Wahrenbrock, to have a witness here from the Connecticut Power Company, who will be able to state that.

By Mr. Wahrenbrock: *Q* As a matter of fact, Mr. Mayott, haven't you stated to the representatives of the staff of the Commission, or in a letter to the Commission that the energy losses in those transformers are negligible? *A* As far as the Exchange is concerned. I have already stated to you that the Exchange itself

has only used the additional losses incurred by the Exchange transactions.

Q And for those purposes, the transfer losses in these transformers may be neglected? *A* They may be neglected in certain cases.

* * * * * * [*1067*]

By Mr. Wahrenbrock: *Q* Mr. Mayott, in your previous testimony you have discussed the procedures of the Connecticut Valley Power Exchange in scheduling exchange operations, and you have referred, I believe, to a practice—I believe it was a daily practice—by which schedules of proposed operations were submitted by the exchange to the load dispatchers or proper representatives of the several companies involved for their consideration, and it was up to them to determine whether they would [*1068*] comply with the proposed schedule. Is that substantially correct? *A* That is substantially correct.

Q Now, I wish to inquire how the exchange learns when certain types of low cost, low incremental cost energy will be available?

Mr. Branch: I think I stated an objection to inquiry as to the objections of the exchange and its methods. I assume my general objection still holds and that it may be considered as being an objection to each question, without any interrupting at the end of the question.

Trial Examiner: I understand the objection is a general objection to matters dealing with the operations and the methods of the exchange.

Mr. Branch: That is right.

Trial Examiner: The objection is overruled and an exception is noted.

By Mr. Wahrenbrock: *Q* I wish to inquire for example, when one of the hydro plants in Massachusetts, such as Cabot, or Cobble Mountain or Gardner's Falls or Dwight station or No. 2 of the United Electric Light is going to spill water, how the exchange is apprised of that fact in order that it may schedule use of that excess energy if it has a place where it can be used. [*1069*] *A*

By keeping close record of what all the plants are doing, on an hour by hour basis, and by close contact with the man in charge of operations for the individual company.

Q Then when such a hydro plant foresees that it is going to have to spill water unless the exchange takes energy, does it telephone or otherwise quickly get in touch with the exchange? *A* It gets in touch with their—the man in charge of that particular company's operations, and he would get in touch with us.

Q And when you say he would get in touch with you, what would he tell you? *A* Conditions at that particular station.

Q Namely, that the particular plant had excess water, and could make it available for use by the exchange? *A* Yes. Of course, as I said, we are keeping in touch with the general situation hour by hour from the readings of the individual stations.

Q You keep yourself—the exchange keeps itself currently, hourly, informed as to the load being served by each of those stations, and the amount of water available at each? *A* Of the load on each station, and the amount of water available to each.

Q And the exchange is able to ascertain from that fact [*1070*] whether a particular hydro station will shortly be able to carry more of a load, or otherwise waste water? *A* Yes.

Mr. Wahrenbrock: Having handed a copy to respondent's counsel and to the Examiner, I direct the witness's attention to a sheet of paper which has been marked by the Federal Power Commission at the top, "Connecticut Valley Power Exchange Rate Schedule F.P.C. No. 1, Effective date, July 1, 1936", and has impressed on it the usual receipt stamp, "Federal Power Commission, July 8th, 1936, received", and ask you if the remainder of this document is a copy of an agreement that you recognize? *A* It is.

Mr. Wahrenbrock: I hand the document to the reporter for identification as Exhibit No. 39.

Trial Examiner: The reporter will mark the exhibit No. 39 for Identification.

(The document referred to was marked as Exhibit No. 39 for Identification.)

[*1071*] By Mr. Wahrenbrock: *Q* I show you the exhibit, No. 39 for Identification, and ask you to state what that is? *A* That shows the arrangement under which the Exchange operates and is signed by the three members of the present Connecticut Valley Exchange, consisting of the Connecticut Power, Turners Falls Power and Electric Company and the New England Power.

Q That is the presently effective arrangement under which the Exchange operates? *A* It is.

Q How long has the Exchange operated under this arrangement? *A* July 1, 1936.

Q Prior to July 1, 1936, under what kind of arrangement contract of agreement did the Exchange operate?

Mr. Branch: Excuse me, I did not hear that on account of the train. May I have it read?

Trial Examiner: Read the question back to Mr. Branch.

(The question was read by the reporter.)

A Under substantially the same arrangement, except for the period of the emergency in 1936.

By Mr. Wahrenbrock: *Q* Was that arrangement reduced to writing? *A* Yes, on several different reports and publications.

* * * * * * [*1072*]

Q Will you give the dates of those several written instruments? *A* I wouldn't attempt to without checking back.

Q Will you give the dates of such of them as you recall? *A* I can't recall any particular dates. There was quite a lot written on the Exchange both by the Exchange and by others.

Q I refer to the agreements under which electric energy was exchanged, and if you can't give the exact dates, will you tell in what year the agreements were made? *A* Well, the first agreement was made in 1935.

Q 1935? *A* 1925, I beg your pardon.

Q Was that agreement in writing? *A* I dont' believe that was made in writing and signed. There were various drafts made, but it was not signed like this was signed.

* * * * * * [*1080*]

Q Was there an agreement dated on or about January 1, 1931, between the Hartford Electric Light Company, the Connecticut Power Company, and the Connecticut Light and Power Company, under which, or pursuant to which, electric energy was exchanged by the so-called Connecticut Valley Exchange, immediately prior to the disconnections in 1935? *A* There was an agreement between the Hartford Electric Light Company and the Connecticut Power Company as to exchange. The exchange, however, has no first-hand knowledge of any agreement as to capital investment, or any other contract as between the companies themselves. All I might give is hearsay, and I am not prepared to even give that on such a contract as you have stated.

* * * * * * [*1083*]

Q You don't know whether there was an agreement about January 1, 1931, between the Connecticut Power Company and the Hartford Electric Light Company and the Connecticut Light and Power Company?

Mr. Branch: I object. I think the witness has stated what he knows. If we want to get facts, why not get at them? I object to this witness being asked a question over and over again. It seems to me he has answered the question and there is no necessity for pursuing the matter any further, no propriety in this question.

Trial Examiner: I will permit the witness to answer the question. I don't think it has been answered in these terms.

The Witness: Please repeat the question.

(Question read by the reporter.)

A The Exchange has nothing to do with contracts, as between companies. I sometimes hear of contracts that are being made and sometimes I do not. As to their terms, I have nothing to do with such terms. You have asked me a certain date. I am unable to recall.

Q Mr. Mayott, isn't it a fact that at and immediately prior to the time of the disconnections in 1935 the Connecticut Valley

Power Exchange, of which you were the manager, was operating under the agreement of January 1, 1931, between the three companies to which I have referred? [*1084*] *A* As I understand it, that was entirely an agreement as to the use of lines as between companies and the payment of capital charges, which do not come under the Exchange at all.

Q Could the Exchange have operated without such an agreement? *A* If I recall what you said rightly, I would say that we are at present operating the Exchange without a corresponding agreement.

Q Could the Exchange have operated, immediately prior to the disconnections in 1935, without an agreement whereby the Hartford-Agawam line and the other lines of the Connecticut Power Company were available for the interchange of electric energy between the Connecticut Power Company, the Hartford Electric Light Company, and the Connecticut Light and Power Company? *A* It was necessary to use the lines of the Connecticut Power Company to conduct such Exchange operations.

Q And it was necessary that the Connecticut Power Company make those lines available? *A* It was necessary that the Connecticut Power Company make those lines available.

* * * * * * [*1086*]

Q Who were the members of the Connecticut Valley Power Exchange immediately prior to the disconnections about August 25th, 1935?

Mr. Branch: Of course, my objection goes to all of this.

Trial Examiner: You may answer the question.

A The Connecticut Light and Power, the Hartford Electric Light and the Turners Falls Power and Electric Company.

Q What was the position of the Connecticut Power Company in the Exchange? *A* The Connecticut Power Company's lines were used for transmission of power.

Q Did it receive a toll for that use of its lines, or a payment? *A* I believe it did.

Q Why were the Hartford-Agawam and the E-lines disconnected in August of 1935?

Mr. Branch: Well, I assume that this question, of course, [*1087*] calls only for the witness's own first hand knowledge if he has it.

Trial Examiner: That is right, if he knows.

A Because they were ordered open by the officials of the Connecticut Power Company.

By Mr. Wahrenbrock: *Q* By which officials? *A* I believe the President, Mr. Ferguson.

Q Did Mr. Ferguson explain to you at any time the reasons for opening those lines?

Trial Examiner: Isn't Mr. Ferguson under subpoena?

Mr. Wahrenbrock: Yes.

Trial Examiner: Perhaps this information better be received from him and save time here.

By Mr. Wahrenbrock: *Q* Were you informed of the reasons for the disconnections? *A* Well, it was generally discussed that the reason was to open them before the Utility Act came into effect.

Q Why, if you know, did the Connecticut Light and Power Company disconnect at New Britain, about the same time?

Mr. Branch: I think the sources of his knowledge ought to appear, if he has them.

Trial Examiner: I think they should appear very definitely, how he knows.

[*1088*] By Mr. Wahrenbrock: *Q* Were you informed by any officials or representatives of the Connecticut Light and Power Company as to their reasons for the disconnection at New Britain, about the same time?

Mr. Branch: Well, I think it should appear that the witness is asked, or ought to be asked, at least, only about conversations or communications he had with officers of the Connecticut Light and Power Company.

Trial Examiner: Well, this is the first question of what I presume to be a group of questions to bring that out, Mr. Branch. I think the counsel should be relieved that the questions are placed in more simple form, and not all in one question. You may answer.

A As I recall, the first knowledge I had that they were going to disconnect came from their Chief Load Dispatcher to my Load Supervisor, who reported it to me.

By Mr. Wahrenbrock: *Q* When was that? *A* That was Saturday, August 24th, 1935, and the note was at 8:55 A.M.

* * * * * * [*1089*]

Q Were records currently made and preserved under your direction, recording the events which took place on the 24th, 25th and 26th of August, 1935, with respect to these several disconnections? *A* They were.

* * * * * * [*1092*]

Q I will ask you what the original is, of which this is a copy? *A* It was a memoranda taken from the various notes that I made or had made during the disconnection of the lines, from the period of August 24th to the 26th.

* * * * * * [*1093*]

Mr. Wahrenbrock: May it be marked for identification Exhibit No. 40?

Trial Examiner: It may be marked for identification as Exhibit No. 40.

(The document referred to was marked as Exhibit Number 40 for Identification.)

* * * * * * [*1095*]

Q Now, just a few questions so that we may understand the references in this Exhibit No. 40. Who is Mr. Day therein referred to? *A* He was vice-president of the Connecticut Light and Power Company.

Q What was his full name? *A* I believe it was I. W. Day.

Q Who is the R. H. B. that is referred to in the first line? *A* That was one of my load supervisors.

Q Working under your direction? *A* Under my direction.

Q Who was Mr. Applegate? *A* General manager at the Hartford Electric Light Company.

Q Who was Mr. Colvin? *A* Vice-president of the Connecticut Power Company.

Q Who was Mr. Whiting? *A* I believe his title is manager of the Canaan division of the Connecticut Power Company.

Trial Examiner: Do I understand the witness to refer to the present title of this party? I would suggest—

The Witness: As far as possible, I am giving the title at the time this was written.

[*1096*] Trial Examiner: That is what I wanted to suggest. I think the record should show what they were at that time.

Mr. Wahrenbrock: *Q* Who was Mr. Hunt? *A* Vice-president of the Turners Falls Power and Electric Company.

Q Who was Mr. Mosher? *A* General superintendent of the Turners Falls Power and Electric Company.

Q Who was Mr. McKearin—M-c-K-e-a-r-i-n—perhaps I don't pronounce that correct? *A* He was engineer for the United Electric Light Company.

Q And who was Mr. Corey? *A* He was chief load dispatcher of the New England Power Company.

Q And the Mr. Mayott referred to in the third paragraph is yourself? *A* Myself.

Q What is the "E" line that is referred to? *A* The "E" line is the line that goes from Falls Village, Connecticut, on the Connecticut Power system, to the Central Hudson Gas and Electric Company system at Poughkeepsie.

Q Who is Mr. A. T. Gray? Who was Mr. A. T. Gray, referred to in the tenth paragraph? *A* He had charge of the dispatching for the Central [*1097*] Hudson Gas and Electric Company. I don't recall his title at this particular time.

Q Who was Yale? *A* Superintendent of distribution for the Hartford Electric Light Company.

Q Mr. Ferguson was Mr. Samuel Ferguson? *A* He was.

Q What was his position at that time? *A* He was president of the Connecticut Power Company.

Q And who was the Mr. Lawrence that is referred to? *A* President of the Turners Falls Power and Electric Company.

Q Who was Mr. Bell that is referred to at the bottom of the first page? *A* Assistant vice-president of the New England Power Company.

Q What does it mean when the statement occurs, "Cutting loops", or "open loops"? *A* My understanding of that is that it was cutting that portion of the transmission line that goes between the two sets of strain insulators on a strain tower.

Q The effect is to break the circuit by cutting a single wire, making a single cut in a wire? *A* Making a single cut in the wire at that particular place.

[*1098*] *Q* And thereby breaking the circuit? *A* Breaking the circuit.

* * * * * * [*1102*]

Q Mr. Mayott, does the maintenance of voltage and the maintenance of a good power factor by the operation of synchronous condensers at the Connecticut Power Company's delivery points on C. P. 1 and C. P. 2, make a more economical operation of those transmission lines possible?

* * * * * * [*1103*]

A Those particular phases are outside of my jurisdiction. I should offhand say that it does cut down the losses somewhat, but I am not prepared to say or to even give any facts on them.

By Mr. Wahrenbrock: *Q* Does the maintenance of voltage and power factor by the operation of synchronous condensers at the Connecticut Power Company's delivery points on the C. P. 1 and C. P. 2 lines increase the capacity of those lines?

* * * * * * [*1104*]

A I believe it does, somewhat.

By Mr. Wahrenbrock: *Q* As manager of the Connecticut Valley Power Exchange, you have to consider the economy of the operation of those lines, do you not?

Mr. Wahrenbrock: I will reframe that question.

By Mr. Wahrenbrock: *Q* You have to take into account the efficiency of the operations of those lines? *A* We do, at times.

Q You have to take into account losses on those lines, [*1105*] do you not? *A* We do.

Q If there were excessive voltage drops on those lines, that would affect the efficiency of the line, would it not? *A* Yes.

Q If there were excessive voltage drops on those lines, would the Exchange be able to transmit as much electric energy over those lines as it could if voltage were properly maintained on the lines? *A* The Exchange can only use such facilities as the companies make available to them without jeopardy to their own loads, their own operation.

Q I don't believe that answers my question. May the question be read?

(The question is read by the reporter.)

A I thought I answered the question.

Trial Examiner: The answer does not appear to me to be responsive to the question.

A (Continuing) We don't transmit as much power over the lines if the lines were heavily loaded as we could if there was more capacity of lines available.

Q Does then the maintenance of voltage and power factor by the operation of synchronous condensers, as I have referred to it, make available increased capacities for the operation of the Exchange? [*1106*] *A* I believe it does, to some extent.

Q Mr. Mayott, did you state in your testimony Saturday that in the operation of the Exchange you considered, in addition to the incremental cost of energy available, the cost of transmitting the energy? *A* I did.

Q Would the operation of synchronous condensers at the delivery points, to which I have referred, affect the cost of transmission of energy? *A* They would.

Q Then it is within the scope of your duties to ascertain costs of transmission, as affected by the operation of those synchronous condensers? *A* The operation of the synchronous condensers is entirely outside of the control of the Exchange. We take the data as they give it and we use that in the Exchange calculations. We have nothing to do with the operation of any of the synchronous equipment. That is entirely within the jurisdiction of the dispatcher for that system.

Q Now, that wasn't my question, Mr. Mayott.

Mr. Wahrenbrock: May I have the question read, please?

(Question read by the reporter.)

A No, we don't figure the cost of operation as affected by the synchronous condensers.

Q As a matter of fact, you do consider the costs of [*1107*] operation, assuming the maintenance of certain power factors and voltage regulation, do you not? *A* That is a study that is almost beyond the Exchange. We sometimes get into a little of that, but that maintenance of voltage is up to the dispatchers for the individual systems.

Q I am not questioning about whose duty it is to maintain the voltage, but I am asking you whether the maintenance of voltage and the power factor is not a basis upon which you make your determinations of transmission costs? *A* The maintenance of voltage doesn't come into the question of costs. We use the actual line losses, that is, the line losses for different loads. We can assume that they are going to maintain their voltage.

Q Isn't the amount of line losses dependent upon the power factor and the voltage regulation? *A* It is.

Q Mr. Mayott, do I understand you to state that the Exchange is not interested in the effect of the operation of synchronous condensers on their line losses? *A* We are interested in line losses,

but we have to take them as they are. We have no control over how they are taken care of by the companies.

Q You are interested in the effect of the operation of synchronous condensers on those line losses, are you not? *A* Will you read the question back?

[*1108*] (Question read by the reporter.)

A To tell you frankly, we have never made any study by the Exchange, that I know of, as to the actual effect of the line losses by synchronous condensers. We of course are all interested in keeping losses down to a minimum, but that particular phase of it has never come into the Exchange calculations.

Q Well, would the Exchange continue its operations in the same way if there were a failure to maintain proper voltage and power factor regulation on the C. P. 1 and C. P. 2 lines? *A* Frankly, I believe it would have very, very little effect upon the Exchange, at the present time.

Q Is the matter of maintenance of power factor and voltage regulation a matter of indifference to the Exchange? *A* No.

Q In scheduling the use of distant available waste power or dump power, don't you consider the line losses that would result from the use of that power? *A* Yes.

Q And wouldn't those line losses be affected by the power factor and the voltage regulation? *A* They would have some little effect on transfer, at the present time; that I would hesitate to say.

Q Well, do you mean to say that the Connecticut Valley [*1109*] Power Exchange could continue its present operations in the same way if the synchronous condensers were not in operation? *A* They have so little effect on the present operation of the Connecticut Valley Power Exchange that it would show no effect in the Connecticut Valley Power Exchange savings, net savings, at the present time.

[*1110*] *Q* Well now, why do you limit that to the present time? *A* Well, any time since 1935—or 1936, I should say.

Q Have you made calculations to determine the amount of such

effects? *A* No. I am giving you my opinion on that particular thing.

Q What are those synchronous condensers there for?

Mr. Branch: Where?

Mr. Wahrenbrock: The synchronous condensers operated at the various delivery points of the Connecticut Power Company on the CP-1 and CP-2 lines.

Mr. Branch: I think it would have to appear that the witness knows where those synchronous condensers are.

By Mr. Wahrenbrock: *Q* Do you know if there are synchronous condensers at the several points at which the Connecticut Power Company delivers energy from the CP-1 and CP-2 lines? *A* I know there are synchronous condensers.

Mr. Wahrenbrock: Now, I ask the reporter to read my original question back to the witness.

Trial Examiner: The reporter may read the question.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: That is entirely outside of my jurisdiction. [*1111*] I could tell you what I thought they were there for.

By Mr. Wahrenbrock: *Q* As a matter of fact, you know what they are there for, don't you? *A* Indirectly.

Q You know what they are there for?

Mr. Branch: Well, I think this is improper. The witness has made a statement of which I think is a proper one, that it is out of his jurisdiction. He thinks he knows what they are there for, and it seems to me that this kind of questioning is improper.

Trial Examiner: I think the information may well be obtained from technical witnesses. If the witness only thinks and doesn't know, and it is said they are not within his province, that seems to be a sufficient answer to the question.

By Mr. Wahrenbrock: *Q* Mr. Mayott, are you an engineer? *A* I am an engineer.

Q Were you trained as an engineer? *A* I was educated as an engineer.

Q What school? *A* Rensselaer Polytechnic Institute.

Q What year did you graduate? *A* I graduated in 1911.

Q What degree did you obtain? [*1112*] *A* Electrical engineering.

Q Did you work as an engineer subsequent to that time? *A* What?

Q Did you work as an electrical engineer subsequent to that time? *A* Except for four years when I acted as a mechanical engineer, I worked in the operating division. I never worked as a pure electrical engineer.

Q How long have you been with the Hartford Electric Light Company? *A* Since 1925.

Mr. Branch: Well—

By Mr. Wahrenbrock: *Q* Since 1925? *A* Since 1925.

Trial Examiner: Did you have an objection to raise?

Mr. Branch: I don't know, it seems to me—how long have you been—it seems to me he was employed at one time by them, but not at the present time.

Trial Examiner: I think the question rather assumes that he is presently employed at the Hartford Electric Light Company, and I thought perhaps that was the objection. I would like to have you clarify that.

By Mr. Wahrenbrock: *Q* Have you recently completed 25 years of service with [*1113*] Hartford Electric Light Company? *A* I have been on the payroll of the Hartford Electric Light Company for 30 years.

Q And prior to your work for the Connecticut Valley Power Exchange, was your work of an engineering nature? *A* It was not. It was operating, except for about four years when it was more mechanical engineering.

Q As an electrical engineer, you are familiar with the operation of synchronous condensers, are you? *A* I am.

Mr. Wahrenbrock: I now wish to ask the reporter to read the question to which Mr. Branch objected, and ask that that question be given.

(Whereupon the question as above recorded, was read by the reporter.)

Mr. Branch: Is that a question?

Trial Examiner: It may be if you put a question mark after it.

Mr. Wahrenbrock: I will ask Mr. Mayott the question—

By Mr. Wahrenbrock: *Q* Do you know what those condensers at the several delivery points on the CP-1 and CP-2 lines are there for? *A* Well, I should assume they are there to maintain the voltage at the various substations. However, there are several other ways of accomplishing the same thing, and as an [*1114*] engineer, I haven't been into that particular phase of the determination as to why—why they were put there.

By Mr. Wahrenbrock: *Q* Well, that maintenance of voltage and power factor materially affects the capacity of the CP-1 and CP-2 lines? *A* I am unable to say without calculation.

Q But you would expect that it would, would you not? *A* I would expect that it would have some effect. The total amount of that effect, I couldn't say without a study.

Q Now, can you predict the effect of the recommendations you make as to exchange operations, without taking into account the effect of alternate apparatus in the several systems, on the economy of the exchange operations, including the synchronous condensers? *A* We never had to go as close as that in any of our operations.

Q Aren't calculations on that point included in the basic data on which your exchange operations are set up? *A* Not that close.

Q Aren't those basic data based on assumptions as to power factor and voltage regulations which are to be maintained? *A* We always operate on the basis that the dispatchers on their own systems will maintain their proper voltage, and if the operations are affecting that voltage, we have to make changes in the loading.

[*1115*] *Q* Does that complete your answer? *A* Well, does that give you what you wish?

Mr. Wahrenbrock: May the reporter read the question and the answer, please?

Trial Examiner: The reporter may read the question and the answer.

(Whereupon the last question and answer as above recorded, were read by the reporter.)

By Mr. Wahrenbrock: *Q* Then the basic data upon which your exchange operations take place do assume the maintenance of power factor and voltage regulations? *A* The maintenance of proper voltage on the systems. We never have operated on the basis of power factor. We take account of reactive transfer, if it is excessive.

Q Then do I understand that in the way you proceed it is necessary for you to experiment and see whether the operations which you schedule can maintain voltage? *A* We know from past experience what to expect. If there are any unusual conditions we have to take care of them at the particular time they do occur.

Q And from that past experience, have you determined that the maintenance of voltage is necessary to exchange operations? *A* Well, we know that the companies have got to maintain [*1116*] their proper voltage for their own operations.

Q An do you know they have to maintain it for your operations? *A* We know that our operations cannot be allowed to interfere with that proper voltage.

Q And do you know that you could not operate if they did not maintain proper voltage, in the way in which you do operate? *A* We know definitely that if our operation interferes with the maintenance of their voltage and the maintenance of safe conditions under their system, that we wouldn't have the transfer.

Q So that, the maintenance of proper voltage is essential to the transfers which your Exchange makes?

Mr. Branch: I object. I think he is leading the witness beyond any reasonable proper bounds.

Trial Examiner: It seems to me that the witness has appeared to find difficulty in answering the question directly, which I think in this case will justify somewhat of a leading question. I will permit the question.

Mr. Wahrenbrock: Will the reporter read the question, please?

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: That is correct.

[*1117*] By Mr. Wahrenbrock: *Q* And do the companies which receive energy at the delivery points on the CP-1 and CP-2 lines operate synchronous condensers in order to maintain that voltage?

Mr. Branch: I object because I think the witness has already said he does not know.

Trial Examiner: I think the question involves a knowledge as to the purpose of the companies, and there being no evidence that they have ever communicated to him their purpose—

Mr. Wahrenbrock: Mr. Examiner, it is a matter of—

Trial Examiner: You lay that ground.

Mr. Wahrenbrock: It is a matter of engineering knowledge that—

Trial Examiner: The purpose is not a matter of engineering knowledge.

Mr. Wahrenbrock: The purpose of certain facilities is a matter of engineering knowledge. It is not a matter of subjective intent.

Trial Examiner: With that understanding, that that is the way the witness understands the question, he may proceed.

Mr. Wahrenbrock: May the question be repeated?

Trial Examiner: Certainly the question as worded indicated that he has a knowledge of the purpose in mind. I suggest the question be reworded.

By Mr. Wahrenbrock: [*1118*] *Q* Do the synchronous condensers which are maintained at the delivery points from the CP-1 and CP-2 lines serve to maintain the voltage at those points? *A* As I understand it, they serve to maintain the voltage within the individual section.

Q Did you say section or center? *A* Individual sections, individual substations, within the individual substation rather than the section.

Q And it is the maintenance of that voltage which you previously said was essential in order that Exchange transfers might take place? *A* No, I said it was essential that the voltage in the transmission lines be maintained on the transmission lines.

Q Be maintained on the transmission lines to correspond to what? *A* What?

Q Be maintained at what point? *A* At the proper level, whatever that might be, for each individual section.

Q And when energy is being transferred, the transmission lines and the substations are interconnected, are they not? *A* They are interconnected, yes.

Q With respect to the three power transformers, the two-winding transformers, at the Connecticut Power Company's [*1119*] South Meadow's Substation, to which we were referring in our questions and answers Saturday morning, are you able to state now the approximate efficiency of those transformers at full load? *A* I can give you such data as I happen to have at the Exchange.

Q Will you do so? *A* This data has not been approved by the Connecticut Power Company, nor checked by me against their data, to date. It is data that we had there and I believe it is approximately correct. You wish the efficiency at full load?

Mr. Branch: May it please the Examiner, I don't know what the purpose of this is, or how material it is, but if it is of any importance I should feel that on the statement of this witness this information would not be the information which we ought to have, but rather some information that has been checked, or something that comes from some source which this witness could be certain of.

Mr. Wahrenbrock: Mr. Examiner, in view of the witness's concluding phrase, I believe it is admissible.

Mr. Branch: He just says it is something they have and it hasn't been checked by him, and it doesn't come from the Connecticut Power Company.

Mr. Wahrenbrock: That isn't all he says.

* * * * * * [*1123*]

Q Will you state what the efficiency of those transformers is? *A* I have checked with the specifications of the transformers, as given by the manufacturer, and on those specifications I find that the efficiency at full load of the 12,000 [*1124*] KVA transformer is 99.1 per cent and for the 7,500 KVA transformer, the efficiency at full load is 99.0 per cent.

Q You have given two types of transformers. Which type is it of which there are two? *A* The 7,500 KVA transformer.

Q Are you able to state which feeders those two types are on? *A* I believe that Feeder 122 goes to the 12,000 KVA transformer and 123 and 124 go to the 7,500 KVA transformer.

Q Respectively? *A* Respectively.

[*1125*] *Q* Have you the information as to the core losses in those transformers at no load? *A* I could find nothing on the specifications that would give the no load or core losses on the 12,000 KVA transformer. Somewheres I had obtained a figure of 39 kilowatts as being that loss, but I can't vouch for that. On the 7500 KVA transformers, the specifications give 32.2 kilowatts as the no load losses, or the core losses.

Q For each transformer? *A* For each transformer.

Q Do you know what the exciting current is on each of those transformers? *A* I do not.

Q How do those three transformers divide the load among them under normal operating conditions? *A* I had that checked, and apparently they divide the load in proportion to their capacity.

Mr. Wahrenbrock: Mr. Examiner, I am a little vague in my recollection of what the situation is with respect to the next question I am going to put. I seem to recall that it has been put and it was the subject of some colloquy, but I am going to put it again to clear the matter up.

By Mr. Wahrenbrock: *Q* Will you state all of the instances subsequent to the disconnections about August 25, 1935, of recon-

nections of [*1126*] the Connecticut Light and Power Company's connection to the CP-1 and CP-2 lines at New Britain. *A* As stated in my previous testimony, the No. 2 CP line was taken out of service between point 12 and 474, to reconnect at New Britain at 1:07 P.M., Tuesday, August 27, 1935. That is Daylight Savings Time. I found on checking that the actual time of phasing at New Britain was at 2:59 P.M., August 27, 1935.

Q Now, will you explain what you mean by actual time of phasing, for the record? *A* The difference between the two times is the time it took to do the work of reconnecting after the No. 2 line was made available to them at 1:07.

Q And the latter time represents the actual completion? *A* The actual completion, and putting the two systems back together again.

Q Over that interconnection? *A* Over that interconnection. That, aside from ordinary switching, which might have occurred, between that time and Friday, May 29, 1936—

Q Excuse me before you go on. You have only described the reconnection of one circuit. Can you state when the other circuit was reconnected or was it reconnected? *A* The other circuit was reconnected, but I haven't the time that it was reconnected. It was probably reconnected [*1127*] a short time after that No. 2 was reconnected.

Q Thank you.

The Witness: Will you please repeat what I had said there?

(Whereupon the question as above recorded, was read by the reporter.)

The Witness: The Connecticut Light and Power was cut away at 8:29 A.M. on the 29th of May. They remained cut away from the system till the hurricane emergency in 1938. Due to the emergency—due to the hurricane, the Hartford Agawam lines were put out of service. At 9:55 A.M. on Thursday, September 22, 1938, Daylight Savings Time, there is this note in the load supervisor's report: "9:55 A.M. After consultation with J. Orr, I requested

J. E. King, of the Connecticut Light and Power at Waterbury to reconnect the New Britain tap to the Connecticut Power Company's lines under emergency conditions due to the flood on the Connecticut River." That is signed "C. W. M.", which I recognize as my note.

On Friday, September 23, 1938, Daylight Savings Time, at 1:45 A.M., there is this note: "Hickok, at Waterbury, reported that C.L.P. phased with Connecticut Power Company at New Britain, at 10:39 A.M., over No. 2 Connecticut Power Company line."

On Wednesday, September 28, 1938, at 3:20 P.M., Daylight Savings Time, there is this note: "As per agreement with [*1128*] Mr. T. T. Zorn, of the Connecticut Power Company, I notified Mr. J. E. King, of the Connecticut Light and Power Company, that the Hartford Agawam line would probably be back in service this P.M. As soon as the lines are in and we are satisfied they are O.K., the New Britain connections will be opened. This will terminate the emergency." That is signed, "C. W. M.", which is myself.

On Wednesday, September 28, 1938, at 9:40 P.M., Daylight Savings time, is this note: "New Britain operator reports the cut away from the CP line at 9:37 P.M. Reported this to the Hartford load dispatcher."

During this period, there was no power transferred to the Connecticut Light and Power Company. Such power as was transferred came entirely from the Connecticut Light and Power Company to the Connecticut Power Company on an emergency basis. Aside from those times, there are no—there have been no reconnections, to the best of my knowledge and belief, at New Britain.

Q Since August 25, 1935? *A* Yes, since August 25, 1935, except for those two times as noted.

[*1129*] *Q* After the disconnection at New Britain in 1936, did the Connecticut Valley Power Exchange begin its formal operations, according to the principles you have explained as being the principles on which it operates? *A* As far as possible, taking into

account the emergency which did not terminate until the latter part of that year.

Q And from that termination of the emergency to which you have referred, on, the operations on the Exchange were conducted according to the plan of operation you have explained? *A* Yes.

Q Until the hurricane in '38? *A* Until the hurricane in '38.

Q Then after the hurricane in '38 and after the disconnection at New Britain at that time, did the Exchange resume its normal operations, according to the plan you have discussed? *A* Yes.

* * * * * * [*1132*]

Q Does energy received at the Connecticut Power Company's South Meadow substation from the Hartford-Agawam line, when delivered to the Hartford Electric Light Company, enter the facilities of the Hartford Company over feeders 122, 123 and 124? *A* It does.

Mr. Branch: I object. I don't think that those numbers mean anything to us yet.

Trial Examiner: I understood that those numbers referred to numbers on this diagram. Is that correct?

By Mr. Wahrenbrock: *Q* Are those the same feeders which have been referred to from Exhibit 38 for Identification? *A* There are no such numbers on 38, as I can see.

Q Are those three feeders the three feeders to the three two-winding power transformers to which you have previously referred in your testimony? *A* They are.

* * * * * * [*1133*]

Q Is electric energy received by the Hartford Electric Light Company from the Hartford-Agawam lines by means of the three circuits shown on Exhibit No. 38 for Identification in the lower right-hand and middle right-hand portions of the Hartford South Meadows Substation? *A* Yes.

Q And your answer refers, and was true as of all times from August 25, 1935 up until a period within the last two or three

months, is it not? *A* No, because they were not connected until 1936.

Q From '36. Thank you. From the connection at the State boundary in '36 up until recently? [*1134*] *A* Correct.

* * * * * *

Q Did the circuits to which you have referred include those three two-winding power transformers whose efficiency you described? *A* They do.

* * * * * * [*1135*]

Cross Examination by Mr. BRANCH.

Q Mr. Mayott, there has been some mention of synchronous condensers. Do you understand that there is a synchronous condenser at the substation of the Connecticut Light and Power Company in Bristol? *A* I so understand.

Q Would the removal of that synchronous condenser have any effect upon the operations of the Connecticut Valley Power Exchange? *A* I don't believe it would.

Q Would the removal of that condenser, in your opinion, have any substantial effect upon the maintenance of the voltage on the CP line?

Mr. Wahrenbrock: May I have the question read before it is answered?

Trial Examiner: You may. The reporter will read the question for the benefit of Commission's counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Wahrenbrock: May it be understood, under normal operating conditions when energy is flowing over the CP lines to the Bristol substation? Without that, I object to the question.

Trial Examiner: Is that the understanding?

[*1136*] Mr. Branch: Yes.

Trial Examiner: The witness may answer.

The Witness: It would have no effect on the voltage on the CP lines.

By Mr. Branch: *Q* Mr. Mayott, I have just one or two other questions to ask you. Do you know whether there was a synchronous condenser in the substation at Bristol before the Hartford-Agawam line was constructed? *A* It is my recollection that there was.

Q When was the Agawam line disconnected first?

Mr. Wahrenbrock: Mr. Examiner, on cross-examination Commission's counsel was not allowed to go into the question of the return on the investment in that line, and it strikes me this is outside of the scope that I was allowed to go into on direct.

Mr. Branch: You went into the matter of these disconnections in great detail.

Trial Examiner: I think this goes to the mechanics, not to the question of cost of operations. It will be permitted. Read the question back to the witness.

Mr. Wahrenbrock: If the question is to be read, may the understanding which I expressed, and which was accepted by respondent's counsel also be read?

Trial Examiner: Well—

[*1137*] Mr. Wahrenbrock: I beg your pardon? That was to the previous question.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: In the excerpts from the Connecticut Valley Power Exchange load control supervisor's report for Sunday, August 25, 1935, there is this statement: "At 12:10"—I will take that back. "Called Hartford load dispatcher. He reported the CP line was cut out at Agawam, at 9:47-1/2 A.M. The 4 line cut out at Agawam at 10 A.M." Both Daylight Savings time.

By Mr. Branch: *Q* What day was that, Mr. Mayott? *A* Sunday, August 25, 1935.

Q Then, on Sunday, August 25, 1935, both circuits that ran north from Hartford into Massachusetts were actually severed at or near the State line? *A* They were actually severed at the State line.

Q Excuse me. Had you finished? *A* Yes.

Q Now, the line that runs from Falls Village to the New York State line, and sent on to Poughkeepsie, New York, is known, at least a part of it, between Falls Village and the New York State line, as the "E" line, is it not? *A* It is.

[*1138*] *Q* And was that line actually severed at or about the same time that the Agawam line was severed? *A* In the notes that I have which were taken from my own—kept for my own benefit—I have this note for August the 24th: "At 6:20 P.M., E line cut out on Connecticut side of Indian Lake, and at 6:00 P.M., loop opened on Central Hudson side of Indian Lake.

Q What does "loop opened" indicate? Is that something in the nature of a disconnection? *A* It is disconnection at a strain tower.

Q Now, that was also 1935, August 24th? *A* That was Saturday, August 24, 1935.

Q Was either the line to Agawam or the line to New York State, which you have called the "E" line connected again until the time of the hurricane in 1938? *A* Yes.

Q What time was it first connected? *A* They were connected —they were reconnected at the time of the flood in 1936, in March.

Q Well, they remained disconnected, both of them remained disconnected from August 24, 1935, to the time of the flood in March, 1936? *A* They did.

Q Mr. Mayott, I think that you have said, or at least indicated, that at times the Hartford Electric Light Company [*1139*] has received energy from the Connecticut Power Company substation just outside of the South Meadow plant in Hartford, is that correct? *A* That is correct.

Q And is it true that at all such times the South Meadow plant of the Hartford Electric Light Company was generating energy? *A* To the best of my knowledge and belief, it was.

Q And is it true then that the bus bar of the South Meadow

station consequently is energized from both of these sources at all times that Hartford is receiving energy from the Connecticut Power Company substation outside of the South Meadow plant? *A* It is.

Q Mr. Mayott, has there ever been generated at any plant any specific earmarked block of power or energy for the Connecticut Power Company, or for use in the exchange?

Mr. Wahrenbrock: Mr. Examiner, I object to the indefiniteness of the question. I don't understand about "earmarked power". I never saw ears on power. I state it that way to make it explicit that there is no showing in the record yet that power can be identified, so there is no point in asking a witness whether identified power was handled.

Trial Examiner: Your point is that it is not responsive—[*1140*] that the cross-examination is not responsive to anything taken up in direct examination?

Mr. Wahrenbrock: That is right.

Trial Examiner: I think that is rather obvious that this does not respond to anything developed on direct examination.

Mr. Branch: Well, as long as I am going to recall the witness anyway, I won't take time to press that matter.

By Mr. Branch: *Q* Mr. Mayott, is any firm capacity on the part of any generating plant involved in the operation of the Connecticut Valley Power Exchange?

Mr. Wahrenbrock: Mr. Examiner, I object, until the word "involved" is defined, and made certain and definite.

Trial Examiner: I think perhaps the word "involved" might be cleared up a little. It is a pretty general word.

By Mr. Branch: *Q* Does the operation of the Connecticut Valley Power Exchange call for any firm capacity on the part of any generating plant? *A* It does not.

Q And has it ever called for any such firm capacity? *A* It has not.

Q Except during some emergency, has the South Meadow plant

at Hartford always generated energy since August 26th, [*1141*] at least ? *A* I am very sure it has.

* * * * * * [*1148*]

Redirect Examination by Mr. WAHRENBROCK.

Q Mr. Mayott, with a peak load on the Bristol substation and the C. P. lines as well, and the Bristol synchronous condenser appropriately adjusted for that condition, if that synchronous condenser were suddenly disconnected, would there be any effects on the indications of the volt-meters on the line at Bristol? *A* There probably would be some indications at Bristol, particularly on the low side of the transformer.

Q What would that effect on the voltage be, to raise it or to lower it? *A* It would probably lower it.

Q Has the operation of the Connecticut Valley Power Exchange called for the maintenance by each member of such firm capacity to supply its own commitments? *A* It has.

Q Does the ability of the Connecticut Power Company to provide power for the Exchange depend upon the firm commitment it has from the Hartford Electric Light Company for capacity? *A* May I have that read again, please?

(Question read by the reporter.)

A I believe I will have to qualify that by saying that the firm commitment by the Hartford Electric Light Company to [*1149*] the Connecticut Power Company does not take into account any power for the Exchange. The demand charge has nothing to do with the Exchange. The Hartford Electric Light Company will supply such kilowatt hours as the Connecticut Power Company draws upon it for, but there is no firm commitment for those kilowatt hours.

Q Do I understand then that the Connecticut Power Company is able to deliver electric energy in exchange operations which it receives from the Hartford Electric Light Company, but which the Hartford Electric Light Company is not committed to furnish it? *A* That is correct.

Mr. Branch: May I have that question read?

Trial Examiner: Read the question for the benefit of counsel:

(Question read by Reporter.)

By Mr. Wahrenbrock: *Q* Do each of the members of the Exchange deliver for Exchange transactions energy which they are not bound or committed to deliver? *A* Yes. No company is bound to deliver any power at any time which it does not wish to deliver at that particular time to the Exchange.

Q Yet large quantities of energy are continuously exchanged by means of the Exchange? [*1150*] *A* Yes.

Q And the quantities of energy which are delivered, which are so delivered, are credited to the accounts of the members making the delivery? *A* That is correct.

Q And such credits are taken into account in the financial settlements which are made monthly among the members of the Exchange?

* * * * * * [*1152*]

A They are.

By Mr. Wahrenbrock: *Q* And is the same thing true where energy is received by members of the Exchange, that is, are quantities of energy received, even though there is no binding obligation on the part of the recipient to take the energy? *A* There is.

Q And are the amounts of energy—

Mr. Branch: It is understood, of course, my objection goes to this whole line of inquiry?

Trial Examiner: It is so understood and will be noted.

By Mr. Wahrenbrock: *Q* And are the amounts of energy which are so received debited to the member receiving them? *A* They are.

Q And are such debits taken into account in the monthly settlements among the members? *A* They are.

* * * * * * [*1155*]

By Mr. Wahrenbrock: *Q* Has the Hartford Electric Light Company been continuously connected with the Connecticut Power

Company South Meadow substation since August, 1935? *A* I know of no occasion when it hasn't been.

Q Have the feeders which have been previously referred to as 122, 123 and 124, continuously been closed—the circuits been closed? *A* At least one of them has been closed all the time. There might have been periods when more—or one might have been out of service for some particular reason.

* * * * * *

Q Mr. Mayott, did your answers which you gave to the credits and debits and the operation of the Exchange refer to the period since the disconnection in 1935, as you gave them?

Mr. Branch: May we have the question read?

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: It is my understanding that it did.

Trial Examiner: I want to ask one question, which [*1156*] possibly may have been brought out on Saturday, but I don't recall it. When was the Hartford-Agawam line constructed?

The Witness: It was constructed in 1924 and put into operation in February, 1925.

* * * * * *

ALLAN D. COLVIN,

a witness called on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q What is your address, Mr. Colvin? [*1157*] *A* My residence is 8 Nathan Hale Street, New London, Connecticut. My business address is 31 Union Street, New London.

Q Do you hold a position with the Connecticut Power Company? *A* I do.

Q What is that position? *A* Executive vice-president.

Q How long have you been executive vice-president, of the Connecticut Power Company? *A* Since January, 1929.

Q How long have you been with the Connecticut Power Company? *A* Since January, 1929.

Q Are you an engineer by training? *A* I am a graduate of the Rensselaer Polytechnic Institute.

Q With what degree? *A* Civil engineer, 1906.

* * * * * * [*1164*]

Q How long was electric energy delivered by the Connecticut Power Company to the Connecticut Light and Power Company under the terms of this contract, of which Exhibit 25 for Identification is a copy, as extended by the two exchanges of letters which are appended as a part of that exhibit? *A* Letters dated November 7, 1938 from the Connecticut Light and Power Company, one of November 8, 1938 from the Connecticut Power Company, one of April 10, 1939, from the Connecticut Light and Power Company, one of April 11, 1939 to the Connecticut Light and Power Company, which extended the service for the East Hampton section until July 1, 1939. The service was actually terminated, according to the Connecticut Power Company's records, on June 30th, 1939.

Q And that service which was terminated on that date had been rendered under the terms of that contract as extended from the effective date of the execution of that contract, had it? *A* As far as I know.

Q Well, do you know? [*1165*] *A* As far as I know, I know of no detail in which the contract was not carried out.

Q Well, the Connecticut Power Company did sell energy at Pole 110 to the Connecticut Light and Power Company, from January 1, 1937 to June 30, 1939, did it? *A* January 1, 1937 to June 30, 1939.

Q And this contract, of which Exhibit 25 is a copy, together with the extensions therein, was the only contract which related to that sale? *A* Yes, sir.

Q And are you able to state whether the Connecticut Power Company had previously sold the Connecticut Light and Power Company electric energy at Pole 110? *A* Yes, sir.

Q It had previously sold them? *A* Yes, sir.

Q And do you recall for what period of time? *A* I do not.

Q Is your recollection sufficient to give us any idea at all of the period of time when it so sold? *A* I believe that it was prior to my connection with the Connecticut Power Company.

Q Which, as you said, was in 1929? *A* '29. To the Central Connecticut Power and Light Company, at that time.

[*1166*] *Q* And the Connecticut Light and Power Company succeeded to the facilities of the Central Company? *A* That is my understanding.

Q Will you describe the facilities by means of which the Connecticut Power Company supplied electric energy to the Connecticut Light and Power Company at Pole 110? *A* As of what date?

Q Under those two contracts, to which we have just referred? *A* Prior to the removal of the old Highway Bridge between Middletown and Portland, the cables were carried across on the bridge structure and went under the draw span in a submarine cable, and then came on and continued on the bridge structure.

* * * * * * [*1171*]

Q Mr. Colvin, I ask you if you can explain the time as of which the big sheet, which has been marked for identification as Exhibit No. 38, represented the facilities of the Connecticut Power Company, without respect to the insert which has been attached to it? *A* As of the close of the year, December 31, 1940, with the exception of an additional retail customer in the Town of Middletown.

Q That is, that the map includes a retail customer in the Town of Middletown, which was not true as of the date December 31, 1940? *A* That is true.

Q With the exception of the inclusion of that retail customer, the main map then is a substantially accurate representation of the facilities of the Connecticut Power Company, which it purports to show? *A* Except as far as work in progress in Torrington.

Q Yes. And that map is a map which you made available to

Commission staff representatives in the latter part of May? *A* Yes, sir.

Q And in order to show facilities at Torrington as of May 26, 1941, did you furnish the Commission representatives [*1172*] with a small insert for the map? *A* We did.

Q And is this small insert, which is stapled to the map, the insert which you furnished us? *A* I think it is part of the insert which we furnished you.

Q I think probably I can answer that, and I believe you will accept my statement, that it is the whole insert which you furnished us? *A* I will take your word for it.

Q It came to me by mail from you without any covering transmittal letter, and that is the insert I received. *A* All right, that is accepted.

Q Now, in order to clear up the relation of the lines, will you state which of the two lines which lead from Torrington substation, on the insert, is attached to CP-1 on the—or should be shown as connected to CP-1 on the main map? *A* For purposes of identification only, starting at the high voltage side of the 15,000 KVA transformer, and going to the transmission line in the shortest possible distance, as shown on this diagram, would connect you with the No. 1 CP circuit.

Q Which is the CP-1 line on the main diagram? *A* It is.

Q The lower line, or the upper line?

[*1173*] Mr. Branch: Of which diagram?

Mr. Wahrenbrock: The main diagram, the big sheet marked Exhibit No. 38 for Identification.

The Witness: On drawing 4031-F, under the title "Exhibit 38" under the point on the map which is lettered 66 KV steel tower transmission line, the No. 2 line is shown diagrammatically near the top of the diagram, and the No. 1 line is shown farther from the top of the diagram. In using the insert, which Mr. Wahrenbrock has described, it is necessary to disregard the section of the diagram above the word "Torrington", which occurs about in the center of the map, and a third of the way from the left-hand edge,

because it is shown on the diagram. It is also necessary to disregard on the flap attached to the diagram, two lines approximately an inch and a half long, occurring between the word "sub"—s-u-b—and corrected May 26, 1941, wherever they occur, to the right of the vertical lines going to the squares indicating two oil switches.

* * * * * * [*1175*]

Q With that correction, on which we have all labored, that explanation, on which we have all labored, Mr. Colvin, [*1176*] will you begin at the point at which the Connecticut Power Company receives electric energy from the 66 KV lines known as the C. P. 1 and C. P. 2 at Middletown, and trace the facilities and describe the facilities as you trace them on the diagram, by which it delivered electric energy to the Connecticut Light and Power Company at Pole 110 under the contracts which we were previously referring to?

Mr. Branch: As of what time?

Mr. Wahrenbrock: The date was fixed by his testimony about those contracts. I will be glad to get them out and go over all that again.

Mr. Branch: You mean during the entire period?

Mr. Wahrenbrock: Yes, with such explanations as may be necessary to account for the changes taking place during the period. I think that is a fair clarification of the question, Mr. Branch.

A Starting at the point where we take energy from the main transmission system of the Connecticut Power Company, the line—

Q (Interrupting) How is that point designated on this diagram? *A* May I finish?

Q I just wish to ask you if you can designate that point on the diagram. *A* Just a minute. The line to Middletown has been com- [*1177*] pletely rebuilt. It formerly went from what is known as "Switching Tower Point 12", located approximately 6 inches from the top of the map, to a 66,000 volt substation in Cromwell,

where it was changed to 13,800 volts and went to the substation in Middletown. That construction was entirely removed subsequent to the 1936 flood, and after the West Side Substation was placed in commission, the energy left the same point, Point 12 Switching Tower, previously described, and went on a steel tower transmission line to what is designated as the West Side Substation on Exhibit 38.

It then went from the West Side through underground cable across the river, in submarine cable, and went to a substation known as Wolcott Lane, which is shown on the diagram about six inches above the word "Division" appearing on the lower margin of the map.

Wolcott Lane Substation has also been entirely rebuilt within the last ten years, but in all cases the circuit from Wolcott Lane started as an aerial cable on poles, and later terminated in an open circuit on poles, to go to Pole 10 on Penfield Hill. The length of the aerial cable between Wolcott Lane Substation and Penfield Hill has varied during the time that is covered by the contract that has been discussed.

At Pole 110 the property of the Connecticut Power Company [*1178*] ceased and the energy was metered on a meter connected to suitable transformers, the meters being attached to Pole 110 and certain apparatus included in a little shanty which was beside that pole.

Q What was that "certain apparatus"? *A* I don't know, sir. The shanty was the property of the Connecticut Light and Power Company.

Q Who owned the meters? *A* The Connecticut Power Company.

Q Was there more than one meter? *A* No, sir; not more than one meter at one time, I cannot tell you that the meter was not changed during the period.

Q The Connecticut Power Company owned Pole 110 and the apparatus on the pole? *A* It owned Pole 110 and the meter. I

don't know that I can divide to an inch the ownership of wire between double arms.

Q And the Connecticut Light and Power Company owned the wire, the conductors from that pole leading toward East Hampton? *A* To wherever that circuit went.

Q Well, I am trying to identify the circuit. That was the circuit that led toward East Hampton, wasn't it? *A* I believe that that circuit did go to the so-called Leesville plant in East Hampton, but I have no direct information [*1179*] on that.

Q I show you Exhibit 26 and ask you if the line from the point marked on Exhibit 26 as Pole 110 to the substation identified as the West High Street Substation, is the line of the Connecticut Light and Power Company leading from Pole 110 to which you have just referred? *A* It is so indicated on this exhibit.

Q Did the Connecticut Power Company have any sources of electric energy available to it at Middletown, which it used to supply the Connecticut Light and Power Company at Pole 110, except the energy which it received from the C. P. 1 and C. P. 2 lines? *A* At what date?

Q During the period it delivered energy to the Connecticut Light and Power Company, under the contracts we have referred to. *A* There was formerly a steam plant located at Middletown. I am of the opinion that we served the Central Connecticut Power and Light Company at a time when that steam plant was in operation, but that date was prior to 1929, so not covered by your contracts. Now, your question is: Did we have any other source of energy in Middletown except the high voltage transmission system of the Connecticut Power Company, is it?

Q That is right. [*1180*] *A* None, except during an emergency period caused by the 1936 flood.

* * * * * * [*1183*]

Q Now, with the exception of two sources of supply, during a few days in 1936, the flood emergency, the only source of electric energy which the Connecticut Power Company sold to the Con-

necticut Light and Power Company at pole 110 was the energy it obtained from the CP-1 and CP-2 lines? *A* That is correct.

Q From August 26, 1935 to July 1, 1939? *A* June 30, 1939.

Q June 30, 1939; is that correct? *A* That is correct.

Q Thank you.

* * * * * * [*1189*]

C. L. CAMPBELL,

a witness called on behalf of the Federal Power Commission, being previously sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Are you the Mr. C. L. Campbell who has previously testified in this proceeding? *A* I am.

Q While Mr. Roraback was still the president of the Connecticut Light and Power Company, and you were the vice-president, did you participate in handling Federal Power Act matters? *A* Yes, I took part in the discussions and conferences that went on in the matter.

Q Did you handle the correspondence with the Federal Power Commission? *A* Well, I handled such of it as took place—as occurred in respect to reports and information that they asked for, and matters of that kind.

[*1190*] *Q* Did you participate in the handling of the questions of making disconnections in order to avoid the incidence of the act at the time of the announcement? *A* Yes, I took part in the discussions that led to that decision.

* * * * * * [*1195*]

By Mr. Wahrenbrock: *Q* On that understanding, what would your answer be? *A* The answer would be that there was no doubt in my mind whatever that you did not have jurisdiction over us. I was as sure of that as I was that the sun rose this morning. I had, however, grave doubts as to whether we were required, under the law, to give that kind of information which you were asking for because that goes into that very broad general which I under-

stand, as to the extent to which Congress can by enactment invade the privacy of private citizens to obtain information which may be helpful to them in the passage of laws, which has never been, as I understand it, fully adjudicated.

Q Directing your attention to the succeeding statement which you make in that paragraph, was it your position that the State of Connecticut could forbid the Federal Power Commission to regulate a public utility in the State of Connecticut, using the words "public utility" in their ordinary connotation?

[*1196*] Mr. Branch: What was that question, please?

Trial Examiner: I think the question better be repeated, especially as to the last part. The counsel doesn't seem to follow it.

Mr. Wahrenbrock: I didn't understand the Examiner's remark.

Trial Examiner: I would like to have the question repeated. Mr. Reporter, will you read the question back?

(Question read by reporter.)

A If my recollection is right, there is a statute in Connecticut to that effect, and I have assumed that Connecticut laws would prevail in the State of Connecticut?

By Mr. Wahrenbrock: *Q* Then it was the position of your Company that the State of Connecticut could validly prevent the Federal Power Commission from regulating a public utility in the State of Connecticut? *A* In so far as the transactions within the State of Connecticut.

* * * * * * [*1212*]

Q Mr. Campbell, I would like to direct your attention to the period of time immediately following the enactment of the Public Utility Act of 1935 and ask you if you recall that Mr. Samuel Ferguson made several efforts to obtain rulings, made [*1213*] two principal efforts to obtain rulings from the Federal Power Commission, which would have enabled the restoration of the Connecticut Valley Exchange operations, without subjecting the companies, or some of the companies to a jurisdiction of the Federal Power Commission? *A* Were you stating a fact or asking me a question?

Q Asking you if you recall that Mr. Ferguson made those attempts.

Trial Examiner: Would you word that question slightly differently, to avoid a conclusion?

By Mr. Wahrenbrock: *Q* Do you recall whether Mr. Ferguson made attempts to obtain such rulings from the Federal Power Commission? *A* By Mr. Ferguson, I assume you mean Mr. Samuel Ferguson, President of the Hartford Electric Light Company? *Q* Yes. *A* Well, I wouldn't have any particular way of knowing what he did or did not do.

Q You had no knowledge? *A* No. I don't say that. He might have mentioned it to me, and if so I might not have paid much attention to it. He was running his company and I was running mine, to the extent that I was running it at that time.

Q Do you recall that he made efforts to obtain rulings from the Federal Power Commission? [*1214*] *A* You say that was shortly after the passage of this Act?

Q Yes. *A* That would be in August or September, along in there, of '35? I frankly do not remember.

Q That is true. And in October. *A* I don't remember anything about it. He may have done so and he may not have; he may have told me that he did, and he may not have.

Q Do you have any recollection that Mr. Ferguson sought to obtain an interpretative opinion from the Federal Power Commission? *A* I can't recall anything. Certainly he wasn't doing it in conjunction with us or on our behalf.

Q Do you have any recollection that Mr. Ferguson sought to obtain from the Federal Power Commission an arrangement which was colloquially referred to as a "trial marriage"? *A* I don't recall anything of that kind, no.

Q Do you have any recollection that earlier; that is, in September of 1935, Mr. Ferguson proposed to obtain an emergency order from the Commission? *A* In September, 1935?

Q Yes. *A* No. I am sorry I don't recall anything about it. There was a period later on, much later on, that that question

arose. [*1215*] I am not saying he didn't , you understand, but I have no recollection of it.

* * * * * *

Q Mr. Campbell, I direct your attention to Mr. Ferguson's letter of October 25, in Exhibit 44 for Identification, and the memorandum attached thereto, and ask you if, by referring [*1216*] thereto and refreshing your recollection you recall the subject matter to which that letter refers?

Mr. Branch: May I have the question read?

Trial Examiner: The Reporter will read the question for the benefit of respondent's counsel.

(The question is read by the reporter.)

A Well, frankly, to the best of my recollection I never saw or heard of the matter before. I am quite sure it was not done for anything in which we had any part.

[*1217*] By Mr. Wahrenbrock: *Q* I direct your attention to the letter of September 27, 1935, in Exhibit 44 for Identification, and ask you if, by referring to that letter and the attached memorandum, your recollection is refreshed concerning the subject matter of that letter and memorandum.

Mr. Branch: What is the date of that letter?

Mr. Wahrenbrock: September 27, 1935.

The Witness: My answer to that is the same. I never heard of it or saw it, so far as I recall.

Q I now direct your attention to September 18th—I beg your pardon—September 16th, 1935, which is a part of Exhibit No. 44 for Identification, and ask you whether, by looking at that letter, you are able to refresh your recollection and recall the subject matter to which that letter refers. *A* I seem to remember this, that Mr. Ferguson, who happens to lunch at the same club that I do quite frequently, mentioned to me at the luncheon table that he had received a letter, I think he said, asking for some information, a letter from the Federal Power Commission asking for some information. As I recall it now—I am relating, or attempt-

ing to recall a conversation which took place almost six years ago —that he had wired to the Commission to know whether the information they were asking for was requested by—I think this was it—requested by the chairman personally, or [*1218*] officially by the Commission, and he had received a reply—because if it was the latter he would have to first obtain permission of the Public Utility Commission of Connecticut to reply—and that he had subsequently received a reply that it was official, insisting that the information be furnished, and that he had thereupon taken it up with the Public Utility Commission, and had received their permission to furnish, and had furnished it. He was narrating it just as—well, as a kind of a news item in the industry. I had nothing to do with it, and it didn't affect me in any way.

Q And was your knowledge of the subject matter of this letter of September 16th and any correspondence or communications which may have preceded it, limited to what you have just said?

Mr. Branch: Was the correspondence limited?

Trial Examiner: No. He said was his knowledge limited.

Mr. Wahrenbrock: I suggest that the question be read.

Trial Examiner: The question had better be read for Mr. Branch's benefit.

(Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: Do you desire the question and answer preceding that read?

Mr. Branch: No. Thank you.

The Witness: Well, I have no knowledge of the matter at [*1219*] all, and I am merely assuming that the conversation which had been related, related to this. I don't know that it did.

Q You had no further knowledge than what you have just testified to? *A* Yes, and I don't know, I can't be sure that that applied to this particular matter.

Mr. Wahrenbrock: I believe Mr. Barney has furnished you with a copy of this (handing document to Mr. Branch).

By Mr. Wahrenbrock: *Q* Mr. Campbell, I show you a copy of

a letter bearing the signature of S. Ferguson, Chairman of the Board, on the letterhead of the Hartford Electric Light Company —that is, I assume the original letterhead was that of the Hartford Electric Light Company because on the top of the carbon copy there is typed, "Hartford Electric Light Company, Hartford, Connecticut"—on the date of September 17, 1935, addressed to you, that is, to Mr. C. L. Campbell, vice-president of the Connecticut Light and Power Company, that being a copy furnished me by Mr. Barney upon behalf of the Hartford Electric Light Company in response to the subpoena recently served upon that company, and ask you whether you received that letter? *A* Well, that I can't tell. I don't recall receiving it.

Q Can you ascertain from your files whether you received that letter? *A* Yes, it probably can be ascertained. The fact that [*1220*] it was sent, I expect it must have come to me, but it wouldn't be a matter that I would—it didn't affect, or concern us, or relate to our company, so I—I receive quantities of information like that which I can't be expected, after six years, to recall having received.

Mr. Wahrenbrock: I ask that the letter be marked for identification as Exhibit No. 45. I will have copies prepared and will be prepared to submit the copies by tomorrow, Mr. Examiner.

Trial Examiner: The letter will be marked as Exhibit No. 45 for Identification.

(The document referred to was marked as Exhibit No. 45 for Identification.)

* * * * * * [*1229*]

Mr. Wahrenbrock: For the purpose of refreshing or attempting to refresh Mr. Campbell's recollection, I would like respondent's counsel to make available for showing Mr. Campbell, a letter to Mr. Roraback dated November 29th.

Mr. Branch: From whom?

Mr. Wahrenbrock: From Mr. W. E., I believe are the initials, Thoms.

Mr. Branch: We have the original here, sir. That introduces this question of privilege, and—

Mr. Wahrenbrock: Well, Mr. Examiner, that letter has [*1230*] been shown to me without objection by respondent's counsel. Whatever privilege there may have been with respect to that letter had been waived by showing it to me without objection.

Mr. Branch: Oh, sir, I think you are quite mistaken about that.

Mr. Wahrenbrock: Well, if you think I am mistaken, I will tell some of the things in the letter, if you would like to have me do so.

Mr. Branch: No, I am quite certain that you got a copy of that letter from somebody else, and so you do know about it.

Mr. Wahrenbrock: Mr. Branch, I received the letter, a copy of it, last night, in the office of The Connecticut Light and Power Company, and it is in the file which was shown to me last night and it is in the list of documents which you submitted to me as the list of documents which you made available for my inspection.

Mr. Branch: Well, may I confer with my associates?

Mr. Wahrenbrock: I think you should.

Mr. Branch: You say you have a copy that we gave you?

Mr. Wahrenbrock: No, sir. You have not given me a copy of that. You made it available for my inspection.

Mr. Examiner, inasmuch as this has been raised, and appears to question the credibility of the statements I have made, I desire to clear myself, and I am going—

Mr. Branch: May I say this in answer—

[*1231*] Trial Examiner: One of you will speak at a time, please.

Mr. Branch: May I make a statement, because I am not reflecting on your credibility at all.

Mr. Wahrenbrock: As the record stands it does seriously—

Mr. Branch: I don't wish to, and I wish to make it clear. I personally have not furnished that to Mr. Wahrenbrock; if it was furnished to him it was done without my knowledge. If he says that it was, and on reflection I find that to be so, I want to be very

clear I am not in any way reflecting on your credibility. I am looking the matter up, but I certainly didn't want to wish to say you were not telling the truth.

Mr. Wahrenbrock: I want to make this clear. You have acted through other persons, but I have consulted with you, and I have looked at only those documents which other persons under your direction made available to me. Isn't that true?

Mr. Branch: I will say this. I am not attempting to evade any responsibility. There were some 600 documents, I think, given to Mr. Wahrenbrock. I did not examine those. I gave certain instructions to my associates, and I think it is quite possible, in the course of this great correspondence, that there may have been some oversight there. I want to make it perfectly clear that I am in no way stating that Mr. Wahrenbrock is saying anything that he believes to be untrue. I am merely saying I had no knowledge of the fact, if it is so, and I did not understand it to be so.

[*1232*] Mr. Wahrenbrock: I think you should go further in your statement and not only say that I am not stating anything which I believe to be untrue, but that I am not saying anything that is untrue.

Mr. Branch: I don't know what—

Mr. Wahrenbrock: I want to make it clear. I hand the Examiner a copy of the list which Mr. Branch himself delivered to me by letter—he didn't personally deliver the letter, but it was covered by his letter of transmittal last Sunday—a list of documents made available to me, and I call the Examiner's attention to the last item in the fourth paragraph on the first page of that list, and in order that the record of the Commission may show what I am trying—what I am referring to, I ask that that list be part of the record in this case, with the letter of transmittal from Mr. Branch, which I will hand you.

Mr. Branch: May I make this statement, sir. I am now informed for the first time that not the original of this letter, which I think never was displayed to Mr. Wahrenbrock, but apparently a copy of it was in some file which I had not seen, and I under-

stand that it does appear that a carbon copy of that letter was among the papers which Mr. Wahrenbrock examined. I was not aware of that fact until this morning. I have the original and didn't realize there was a copy that was given to them.

* * * * * * [1237]

Mr. Wahrenbrock: Mr. Examiner, I ask that the long list be marked Exhibit 46, Mr. Branch's letter of transmittal of the long list be marked Exhibit 46-A; the short supplementary list be marked Exhibit 46-B and the letter of transmittal dated July 15th, of the short supplementary list be marked Exhibit 46-C, all of these for Identification only.

Trial Examiner: The reporter will so mark them.

(The documents referred to are marked as Exhibits numbers 46, 46-A, 46-B and 46-C, respectively, for Identification.)

Mr. Wahrenbrock: May the copy of the letter to which I have referred be produced for the witness's reference?

Mr. Branch: What did you say?

Trial Examiner: By that you refer to the letter to Mr. W. E. Thoms. I am not sure that I know which is which on that.

Mr. Wahrenbrock: It is the letter from Mr. Thoms to Mr. Roraback dated November 29th, 1935.

Mr. Branch: I have the original and I object to producing it on the ground that it is a privileged communication between attorney and client.

Trial Examiner: In that case, Thoms being counsel for the Connecticut Light and Power Company, you mean?

Mr. Branch: Yes, sir.

Trial Examiner: It would seem to me that the question of what is to be submitted in response to the subpoena would be a question for determination. Do I understand that you now [1238] take the position that you decline to produce this document on the ground that it is a privileged communication?

Mr. Branch: I don't want to say "decline", sir. I am raising that objection, but will obey your ruling, whatever it may be.

* * * * * * [*1240*]

Trial Examiner: As I understand this list was prepared by other members of the staff of counsel, under your direction, was it not?

Mr. Branch: It was prepared by the stenographic force of the Connecticut Light and Power Company on Sunday, sir, at the request of Mr. Wahrenbrock.

[*1241*] Trial Examiner: But they were acting under the supervision of the members of the legal staff, were they not?

Mr. Branch: I told them to prepare a list of everything Mr. Wahrenbrock had seen, and I don't want to be understood at all as questioning the fact that this document appears in the list and that he saw it. I want to make that perfectly clear. That is, a copy of the document.

Mr. Wahrenbrock: Mr. Examiner, may that statement be augmented by this.

The documents which I saw were documents made available to me in the offices of the Connecticut Light and Power Company by officers or employees of that company acting under the direction of its counsel.

Mr. Branch: Of course I assumed that Mr. Wahrenbrock understood that everything that he has done in going there, and so forth, has been at times that we have arranged, and with our permission.

Trial Examiner: It would seem clear to me that it is the duty of respondent's counsel to determine what documents would properly be both within the scope of the subpoena and otherwise, in their opinion, proper subjects of the subpoena, and being used in evidence, and if by reason of convenience, they have chosen to hurry this up and in doing it inadvertently something may have escaped them, I don't think that Commission's counsel can in any way be held responsible for that. Since [*1242*] there seems to be a clear duty on the part of the respondent's counsel to check such matters before releasing them, I fear it will be necessary to rule as to this particular document that by the submission of the

list and copy, counsel has waived any right to claim privilege. Passing for the present to the question of whether the privilege may be claimed as to this particular document, the Trial Examiner rules that privilege has been waived.

Mr. Branch: May my exception be noted, sir?

Trial Examiner: Your exception will be noted. You may proceed.

Mr. Wahrenbrock: Will the Examiner direct that the document in question, the carbon of the document in question, be produced?

Trial Examiner: May that be done? May the carbon be produced for the inspection of the witness?

Mr. Branch: The carbon?

Trial Examiner: The carbon copy of this letter which is referred to as having been shown to Commission's counsel.

Mr. Branch: Subject to my objection, and may I state here that I object to any use of it at all without the necessity of my rising each time the thing is mentioned?

Trial Examiner: It is so understood.

(The document was produced and handed to Commission's counsel.)

* * * * * * [1258]

Q Mr. Campbell, in this answer which you gave on page 913 of the transcript, I believe you were referring to a copy of Mr. Ferguson's letter to the Federal Power Commission, dated September 16, 1935, which is attached to and forms the last part of Exhibit No. 44 for Identification, and in that answer as reported by the transcript you said:

> "*A* Well, I assume that this is a letter written by Mr. Ferguson to the Commission, in respect to his own company and with respect to his own business. It may be that after he had sent it, either promptly or at some subsequent date, he may have sent a copy of it to our office. We may or may not have read it. We get a great deal of information in our office about various matters, the activities of other companies,

some of which we are not interested in and some of which we are not. I do not recall ever having seen it before, and yet I don't want to be understood by that to say that it did not come, perhaps, even in a letter addressed to me, but even under those circumstances, I would not have felt impelled to have read it, because it presumably dealt with [*1259*] matters concerning the Hartford Electric Light Company, not with our company. We will do our own corresponding."

That completes my reading of your answer. Now, would you say the same thing was true with respect to the memorandum and letter of transmittal which is Exhibit No. 47 for Identification?

* * * * * * [*1260*]

Trial Examiner: Answer it and make your explanation.

The Witness: Well, the answer is substantially the same, excepting with this difference. In one case I was referring—I was answering a question relating to a letter from an officer of another public utility company to the Federal Power Commission. I have nothing to do with—I have nothing to do with such letters being written, and I had no control over them. I was saying that if a copy of it had been sent to me, I might or might not have paid any attention to it. This letter of November 19th is a letter addressed by the same officer of the other public utility to our president, setting forth what he thought would be a sound and proper way to carry on some business in which we were jointly interested, and he asked me—he states, "We hope that you will see your way to take the same position."

Now, that is entirely a different kind of a letter. That would call for some kind of a reply to it, because it was addressed to us. With that difference, the answer perhaps is about the same. We would have paid to it such attention as we felt our interest called for, and, as I remember it, I think it was suggested that a conference might be had.

* * * * * * [*1262*]

Q Did this subject matter involve the question of the continu-

ance of interchange of electric energy between your company and the other members of the Exchange at New Britain? *A* Yes.

Q And the continuance of that exchange was regarded by your company as dependent upon the resolution of the questions raised by this memorandum, was it not? *A* No. It was dependent upon the Connecticut Power and the Hartford Electric Light Company severing their connections with the out-of-state companies.

Q And this memorandum proposed a basis of understanding upon which it was expected that an agreement might be reached between your Company and the Hartford Company for continued [*1263*] interchange of energy? *A* Well, of course, I don't know what was in Mr. Ferguson's mind when he wrote the letter, other than what he wrote. It appears on its face to be a suggestion from Mr. Ferguson that we should reconsider the previous position that we had taken in the matter. These memoranda were apparently his views, his ideas of what, as he says, would be a sound position to take. I assume that was the purpose of it. I of course do not know. He doesn't say so.

Q Did the Connecticut Light and Power Company at any time point out to Mr. Ferguson any error of fact as stated by him in this memorandum, Exhibit 47 for Identification? *A* Well, we never had the memorandum. Oh, 47? I beg your pardon. Yes. You mean the memoranda attached to Mr. Roraback's letter?

Q Attached to Mr. Ferguson's letter to Mr. Roraback. *A* Not so far as I know, but we wouldn't necessarily have felt under any particular obligation to do so. He was setting up a proposition and a picture which we were not much interested in, and we were going through what I think probably could be described as polite motions to turn him down.

Q Your Company had already determined what its position would be? *A* Yes.

Q And what was that position? [*1264*] *A* That we would not continue our connection with the Connecticut Valley Exchange, I think it was called, so long as there were connections between that system and out-of-state companies.

Q Why not? *A* Because we felt that there were two reasons: First, that the Federal Power Commission might take the view that those facilities were used in the transmission of interstate power, and that the Connecticut Light and Power Company, as a member of that exchange, which was not an incorporated body—it was just an association—might take the view that the Connecticut Light and Power Company as a member of that association, was operating those facilities, and if they were right, if they should be right in their possible contention that interstate power was transmitted over those facilities, then the operation of those facilities by us as a member of that Exchange, might bring us within the jurisdiction of the Federal Power Commission.

The other reason was that pumping power into that Exchange might be held that some of the power which we generated and pumped into that Exchange, found its way through these connections that I speak of, into other states, which again might be construed to subject us to the jurisdiction of the Federal Power Commission. So, for the two reasons, we withdrew.

Q I call your attention to the statement which appears [*1265*] on the second page of the memorandum attached to Mr. Ferguson's letter of the 19th of November, Exhibit 47 for Identification, under the heading: "Points B and B-1, substations of the Connecticut Light and Power Company."

Mr. Branch: Just excuse me a moment. We are in a little disagreement as to Mr. Campbell's answer to the last question. We would like to have it read.

Trial Examiner: The reporter will read back the answer to the last question.

(Answer is read by the reporter.)

Mr. Wahrenbrock: Will the reporter read as much of the present question as I had gotten off my chest?

Trial Examiner: The reporter will read the question for the benefit of Commission's counsel.

(Pending question read by the reporter.)

By Mr. Wahrenbrock: *Q* Mr. Campbell, by referring to the

map, which is a part of Exhibit 47 for Identification, will you state for the record what the points B and B-1, or B-prime, whichever it may be, referred to in the memorandum, are? *A* Where are they located, do you mean?

Q Yes. *A* They are down in the lower right hand corner, just below the word "Montville", and just to the right of the words "New London".

[*1266*] *Q* Is the point B, the Groton-Long Point High Voltage Substation? *A* Is the point B, you say?

Q Yes. *A* Well, I don't know what they call it. It is the first point of delivery to Groton by us.

Q Is the Point B prime the so-called Trails Corner Substation, in the Borough of Groton? *A* Well, I don't know whether it is located in the Borough of Groton or not.

Q Those are the substantial locations of the points indicated by those two letters, are they not? *A* Yes.

Q On that understanding, is the statement which follows true:

> "These are points of delivery for power sold by the Connecticut Light and Power Company to the Electric Department of the Town of Groton."

Was that statement true, as of the time of this memorandum? *A* Well, it is difficult for me to answer that with this lapse of time, because we have a great many substations, and just where the point of delivery was to Groton, at that particular time, I hesitate about answering, because I can't recall it very clearly.

[*1267*] *Q* Your company never denied the accuracy of that statement as made there? *A* This statement made by Mr. Ferguson?

Q Yes. *A* It has not been our practice to deny the accuracy of statements made by other officers of other utilities with which we have nothing to do.

Q In the course of the negotiations of this sort—in the course of this negotiation with the other company, did you or did you not ever deny the accuracy of that statement? *A* The only nego-

tiations which might have followed from this letter would have referred to the restoration of the interconnection, or an exchange of power with the Connecticut Valley Power Exchange. This particular situation had nothing whatever to do with it, therefore, it wouldn't be necessary to deny or affirm it, or make any mention of it whatever. It had no bearing on it whatever.

Q Now, will you answer my question? *A* Well, therefore, I should say we did not deny it, neither did we assent to it.

Q You did not deny it? *A* Neither did we assent to it.

Q Is the next statement true as of the date of this memorandum? That statement reads: "This power is eventually sold by Groton to its customers within the State. One of [*1268*] these customers, Fishers Island Farms, transmits the major portion, but not all of the power so purchased, to Fishers Island, New York."

* * * * * *

A The first sentence is correct as stated. The [*1269*] second sentence is correct, excepting with this qualification. I don't know the corporate name or the correct name of the particular customer to which he has referred to as "Fishers Island Farms". Secondly, I don't know what proportion of the power so purchased by Groton is sold by Groton to that particular customer named as Fishers Island Farms. I don't carry it in mind. So whether it is a major portion or a small portion, I am unable to say.

Q I think the record will show the exact ratios. *A* I have no doubt of it. I just don't have it in my mind.

Q And I think also the record will show the accurate name of the company on Fishers Island. I call your attention to the paragraph at the bottom of the same page, being the paragraph numbered 2, under Point C—substation of the Connecticut Light and Power Company, with the introductory clause reading, "This substation is used for two purposes: First,"—and I will skip the first one. "And 2, to receive and distribute within the State, power purchased from the Connecticut Power Company, which power may according to the business necessities of the Connecticut

Power Company, have been generated either in its own plant, or had been purchased in whole or in part from other companies, within or without the State." And I direct your attention to the map which accompanies the memorandum, or a part of the [*1270*] memorandum, and point out that the point C referred to is New Britain. Now, with that understanding, was that statement accurate as of the date of the memorandum? *A* No.

Q Was that statement accurate as of the time immediately before the disconnections which occurred on or about the 25th of August, 1935? *A* Well, I should say no. But I probably don't know.

Q Well, will you explain? *A* Yes. The substation referred to is used in addition to the purposes set forth under paragraph 1, to receive the power purchased from the Connecticut Power Company, which power was to be delivered to us by the Connecticut Power Company from facilities of its own, or, backed up by a contract it had for firm power with the Hartford Electric Light Company, which—so that between them we were satisfied that they had the capacity with which to meet our needs, and so far as we know, that is where our knowledge stopped.

Q You then state that so far as was known by the officials or employees or representatives of your company, that you had no knowledge of where the power actually received by you at New Britain came from? *A* Yes.

Q It may have come from Canada, it may have come from [*1271*] New York City, it may have come from any place, so far as you know? *A* No, I don't think I would like to embrace Canada in it, because of our general knowledge as far as I know, there were no physical connections that were even possible for any energy to come through.

Q Then you do have some knowledge of physical connections outside of your own system? *A* Yes.

Q What physical connections were there by which this power might have come to your system? *A* From Canada?

Q From any place else than from the Hartford Electric Light Company? *A* At what date?

Q As of the time immediately prior to the disconnection which took place about August 25, 1935.

* * * * * * [*1272*]

The Witness: There are so many interruptions—I am sorry, but is that question as to whether I knew of any connections with that system—that the Exchange had with out of State systems?

By Mr. Wahrenbrock: *Q* It asks for your knowledge of connections by which the energy which you received in New Britain could have been supplied.

Mr. Branch: I don't think he said there was anything of [*1273*] that kind.

Trial Examiner: I think he said that he had a knowledge of physical connections, and the letter and memorandum raises the question as to the existence of such sources of energy. The witness may answer the question.

The Witness: I knew that prior to August 26, 1935. that is the date, that the Connecticut Valley Exchange had lines which connected with systems outside of the State. I don't know, and I didn't know then, that any of that power that came from outside of the State over those systems was ever received at this particular substation.

Q Didn't you know about the operations of the Connecticut Valley Power Exchange? *A* Yes.

Q Didn't you know that the way the Connecticut Valley Power Exchange could realize savings was by using low incremental cost energy wherever it could be derived, and that included using it from out of the State at times? *A* No, I didn't know that, whether it was out of the State or where.

Q Didn't you know that one of the sources of savings by the Connecticut Valley Exchange operations was using the low cost, or zero cost energy from the hydro plants up in Massachusetts?

Q Yes, but I didn't know that any of that energy went [*1274*] to New Britain.

Trial Examiner: Is your answer yes or no to that?

The Witness: I answered yes.

By Mr. Wahrenbrock: *Q* If you didn't know whether any of that energy went to New Britain, why did you cut your New Britain interconnection? *A* I just stated the reason we cut the New Britain interconnection was because we might have been deemed or treated as one of the operators of that system over which some power from outside of the State was transmitted to points unknown, as far as I am concerned, and over which possibly power which was generated by our own company and delivered to that system might have gone into other States. Those were the reasons we disconnected.

Q And the other reason—you gave two—the other one was that some of the out of State energy might come down under your own system? *A* No, I don't think I said that.

Mr. Branch: No, he didn't say that.

Trial Examiner: I don't think that was the statement. We will probably have to go back to the transcript to get it determined.

By Mr. Wahrenbrock: *Q* If your reason had been as you just stated, and it [*1275*] did not include the one I thought you stated, wouldn't it have been sufficient if you had just stopped being a member of the Exchange?

Mr. Branch: I object to that question.

The Witness: We didn't deem it so, so we took the step that seemed right.

By Mr. Wahrenbrock: *Q* You physically disconnected in order to prevent any of that energy from coming on your system? *A* No, sir. We physically disconnected for the reason I stated—I think this is the third time—that we did not wish to be considered or possibly construed to be operating a system over which interstate power might have been transmitted. That was the prime reason.

[*1276*] *Q* In that case, why didn't you cut the Groton connection? *A* Because we did not consider at that time that that was a facility of the character that was transmitting out-of-state energy.

Q You knew that you were, to use the expression which you have previously used, pumping energy that went into New York State, didn't you? *A* We knew that we delivered energy to a Municipality, and that some corporation, whose name I don't exactly recall, something to do with Fishers Island, came to that Borough, or the shores of Connecticut and took it away.

Q So that you knew that you were pumping energy out of the State? *A* No, I wouldn't say that; we weren't doing it.

Q How would you distinguish that from the situation where you delivered electric energy to the Connecticut Power Company at New Britain and it subsequently took it out of the State, so far as the electric energy is concerned? *A* As I have said, there were three reasons why we disconnected from the Exchange. Certainly the first reason didn't apply in the Groton situation.

Q What was that first reason? *A* The first reason was the owning of operating facilities used in interstate commerce; that is, used in the transmission [*1277*] of interstate power. That is not, in our judgment.

Q Why doesn't that apply to Groton? *A* Well, we didn't consider we transmitted it at that time.

Q All right. I would like to ask you to state what factors upon which you differentiated, in saying that when you delivered electric energy at New Britain, which electric energy subsequently went out of the State, you might properly be held to be transmitting electric energy in interstate commerce and when you delivered electric energy at the Borough of Groton, which was subsequently transmitted out of the State, you were not transmitting electric energy in interstate commerce? What facts differentiated those two situations, in your mind, in 1935? *A* The transformation that took place of the power at the delivery point to Groton, for one thing; secondly, this action taken in respect to the Exchange was taken practically at the time the Act was passed, just prior to it. The Act was new; we were studying it all the time, and endeavoring to follow the rulings and interpretations that were being placed upon the Act by either formal or informal deci-

sions or actions of the Federal Power Commission, and as we found situations which had looked to us, under the law, as we interpreted it, which came, by subsequent rulings or decisions of the Commission, into what I would refer to as a danger zone; that is, where the [*1278*] Commission might apparently hold that to be a transmission in interstate commerce, we would endeavor to correct that situation, so as to conform to what has been the established policy of the Company for many years, to remain purely in intrastate.

Q And that policy has continued down to the present day? *A* Yes.

Q Did that enter into your consideration in terminating your purchases from the Connecticut Power Company at Pole 110, to supply East Hampton? *A* It might have. There might have been other considerations also, common to the service, or something of that kind.

Q It was one of the considerations? *A* I have no doubt it was.

Q I believe that in discussing the Groton situation just now, you said that you did not consider in 1935 that you were transmitting electric energy in interstate commerce. When did you subsequently take a different view? *A* No, we didn't take a different view, excepting in so far as we were influenced to take a different view by what appeared to be the attitude, I mean, the rulings, or trend of the Federal Power Commission, in their interpretation of the Act as matters came before it, not affecting us, but affecting others, which seemed to indicate that they so construed it. So we felt that [*1279*] we might remove the point of argument.

Q And that was the reason for asking the Borough of Groton to discontinue serving Fishers Island? *A* I don't know that we ever asked the Borough of Groton to discontinue serving Fishers Island. We told the Borough of Groton that we would not enter into a contract for the supply of power to the Borough until they would be able to assure us that they would confine their sales of power

to the territory which they had a right under the laws of Connecticut to supply.

Q And that was in accord with the policy you have just stated? *A* Yes.

* * * * * * [*1279*]

Q I wish to ask you if the Connecticut Light and Power Company made any suggestion to Mr. Ferguson or Mr. Ferguson's associates with respect to the omission of the part of this memorandum attached to Mr. Ferguson's letter of November 19th which follows under the heading "Points B and B-1"? *A* My recollection is that following the receipt of this letter it was suggested that a conference be held. I don't believe any such conference was held. Whether it was our fault that it wasn't held or Mr. Ferguson's, or just what, I don't know, but anyway I don't believe it was ever held. Undoubtedly if a conference had been held, perhaps these inaccuracies in this statement would have been discussed and [*1280*] pointed out, but they were not pointed out prior to any such conference or formally in any way. I don't believe they were discussed with Mr. Ferguson.

Q None of what you have termed inaccuracies were called to Mr. Ferguson's attention? *A* Not as I recall it, because there was no particular reason for doing so. He can have as erroneous an idea as he wishes to about our system and it is not a matter of interest to me.

* * * * * *

Q Did you know at that time, or did any representatives of the Connecticut Light and Power Company know at that time, that Mr. Ferguson had submitted substantially the same memorandum to the Federal Power Commission? *A* I don't know, and I don't believe any of our officers or employees did know.

* * * * * * [*1282*]

Q You have no knowledge whatever of the circumstances under which the latter letter, which is Exhibit 18, was induced to be

written? *A* Well, I didn't know it was induced to be written. I know that the matter, this whole question involved in these two letters, was discussed between Mr. Tiffany and Mr. A. V. S. [1283] Lindsley, one of our vice presidents. What transpired between them, I don't know.

Q Weren't the results of those conferences and relations reported to you? *A* Oh, yes, those letters—I didn't mean to suggest that I wasn't familiar with those letters, but I don't know what transpired between Mr. Lindsley, representing our company, and Mr. Tiffany, of the Groton Company.

Q Wasn't it reported to you that the second letter had been written after the first letter had been shown to the representatives of your company, upon the suggestion of the representatives of your company? *A* All I can say as to that is that I seem to recall that the first letter was shown to me, and we felt it was not correct, and I asked Mr. Lindsley to go and see Mr. Tiffany and discuss it with him. What took place in the discussion, I don't know. I was subsequently shown the letter of the next day, which seemed to be correct.

Q When you asked Mr. Lindsley to discuss the first letter with Mr. Tiffany, how was he to discuss it? *A* Well, the first letter appeared to be inaccurate, as we understood it, as we understood the circumstances in certain respects, and the purpose of Mr. Lindsley to go and see Mr. Tiffany was to discuss those inaccuracies.

* * * * * * [1292]

Q Was there any attempt prior to 1939 to have the Borough of Groton discontinue selling to the company that served Fishers Island Farms? *A* I don't think so, no. No, not so far as I recall.

* * * * * * [1293]

By Mr. Wahrenbrock: *Q* I show you copies of a letter from Mr. Roraback to Mr. Ferguson, dated November 22nd, 1935, and of a carbon copy of a letter from Mr. Ferguson to Mr. Roraback,

dated November 23, 1935, which has been furnished me by Mr. Barney in response to the subpoena directed to the Hartford and Connecticut companies and Mr. Ferguson, and ask you whether you have seen those letters, or copies of them, before.

(Letters handed to the witness.)

A Just recently, when they were produced out of the files as a result of, I believe, your inquiry for them.

Q Yes. And from that inspection are you able to identify those as the letters that were sent and received? *A* Yes, I should say that those are copies of the letter, and I might add it confirms my recollection that it had been [*1294*] suggested that a conference —I don't recall at the time whether the suggestion for a conference was made orally or whether it was made by letter. Evidently it was by letter.

Mr. Wahrenbrock: If I can get one or two more statements about this, I don't believe it will be necessary to put them in the record.

By Mr. Wahrenbrock: *Q* Do they show both Mr. Roraback and Mr. Ferguson agreeing that a conference should be held with respect to the matters raised originally by Mr. Ferguson's letter of November 19th, 1935? *A* Yes, they do.

Mr. Wahrenbrock: Mr. Examiner, I offer Exhibit 48 for identification in evidence at this time.

Mr. Branch: Which is that? I object on the ground that it is immaterial, as well as on the other grounds which I have specified, in connection with mention of this letter, but I don't see what possible bearing it has. This witness said he thinks he never saw the letter. has no recollection of having seen it until a day or two ago.

Trial Examiner: Do I understand that there is any question as to the signature of Mr. Thoms?

Mr. Branch: I have no doubt that that is his signature, sir.

Trial Examiner: Exhibit Number 48 will be admitted. Note [*1295*] an exception for the respondent.

(Exhibit Number 48 for Identification was marked Exhibit Number 48 in Evidence.)

By Mr. Wahrenbrock: *Q* Mr. Campbell, I show you a letter, purporting to be signed by V. E. Bird, President, on the letterhead of the Hartford Electric Light Company, dated September 26th, 1935, and addressed to Mr. Irvin W. Day, Vice President of the Connecticut Light and Power Company, which is the letter which has just been handed to me by Respondent's Counsel, and ask you if that letter was received by the addressee. *A* Well, of course, I can't tell. I have no way of knowing. I happen to be familiar with Mr. Bird's signature, and I know that is it; at least, I recognize his signature, but as to whether that is Mr. Day's, who was formerly a vice president of our company, I can't tell you from this.

Q The letter was taken from the files of the respondent. *A* Then it was received by him.

Mr. Wahrenbrock: Mr. Examiner, counsel for the respondent have offered to make copies available—at this point I would like to reserve an exhibit number, and have the copies when available tomorrow morning, marked for identification. I will then offer them in evidence.

Mr. Branch: I want to be accommodating, but I didn't promise we would have them for tomorrow morning. I think you [*1296*] hadn't requested the copies of this, so we have had no opportunity. We will do it at a reasonably convenient time.

Mr. Wahrenbrock: I accept the modification. I should not have stated "tomorrow morning". When you reasonably can have them—is that agreeable to the Examiner?

Trial Examiner: You desire, in order to keep this with a similar matter, to reserve an exhibit number?

Mr. Wahrenbrock: Yes. That number would be 49.

Trial Examiner: All right. It will be understood that Number 49 in the Exhibits for Identification will be reserved for this exhibit, when copies are prepared.

(Exhibit Number 49 is reserved for the document above referred to.) (For Identification.)

Mr. Wahrenbrock: Can respondent's counsel provide copies of the letter of November 26, 1935 from A. I. Campbell, Special Engineer, to W. E. Thoms?

Mr. Branch: Did you request us to make a copy of that?

Mr. Wahrenbrock: Yes. It is the last item on the second page of your list, Exhibit 46 for Identification.

The Witness: It ought to be A. J. The second initial happens to be "J".

Mr. Wahrenbrock: That is my mistake. It is Alex J. Campbell on the list.

Mr. Branch: Am I correct, Mr. Wahrenbrock, in assuming that the only place that you have seen this letter was when you [*1297*] looked at our papers at our office?

Mr. Wahrenbrock: I know that I have seen it twice, when looking at the papers you made available to me in your office, it being part of those papers. I cannot say definitely, in the large number of papers I have looked over, because I have looked over not only the 660 you have made available, but all that Mr. Tiffany made available, and all that Mr. Barney made available, and I cannot make a statement as to whether I have seen a copy of it elsewhere or not.

Mr. Branch: I have, I might say, a copy of the letters, and have made photostats at the request of Mr. Wahrenbrock, it being apparent that he had seen this letter when he was making this inspection which, of course, I did not assume, under the arrangement we made, was in any way to affect our legal rights as to anything. I object to this on the ground that it is privileged, as being a communication from client to attorney and the only copy is one that was kept in our files and was not divulged to anybody else except under an arrangement, which, as I say, I didn't suppose in any way was intended by counsel for the Federal Power Commission as one he would take advantage of. I also feel that the

matter is immaterial. I will be glad to make such disposition of this matter as the Examiner feels proper under his ruling, reserving all of my rights.

[*1298*] Trial Examiner: The Examiner feels that in this case, any right to raise the question has been waived by the inclusion of this letter in the list of those submitted under the subpoena duces tecum, and that if there is any privilege, it has been waived. I understand the question is whether—

Mr. Wahrenbrock: To put the question, Mr. Examiner, I will ask that the Examiner direct the respondent's counsel to produce copies, it being understood that his objection goes not to his being required to make copies but his being required to disclose the matter copied.

Trial Examiner: Well, in view of the response, which shows that the carbon copy of the letter has been listed as being among the items submitted, I see no reason why counsel should not turn over the copies, if that is the understanding.

Mr. Branch: Very well, sir. I do so, reserving my rights in making objection to doing so.

Mr. Wahrenbrock: Thank you.

Mr. Branch: I take it an exception is noted to your Honor's ruling in regard to this whole matter?

Mr. Wahrenbrock: I hand one of the copies which has just been handed to me, to the reporter and the other to the Examiner, and retain the third one, and ask that the reporter mark it for identification as Exhibit Number 50.

(Document is marked Exhibit Number 50 for Identification.)

[*1299*] Mr. Wahrenbrock: I offer Exhibit 50 in evidence.

Mr. Branch: I object not only on the grounds already stated, but also on the ground no materiality has been shown.

Trial Examiner: I would like to have a statement as to the purpose of this exhibit.

Mr. Wahrenbrock: Mr. Examiner, the exhibit appears on its

face to be a statement made by Alex J. Campbell, special engineer to Mr. W. E. Thoms, pursuant to a telephone request from Mr. Thoms, and it gives Mr. Thoms what it describes as a brief outline of the connections of the Connecticut Power Company, with transmission lines extending beyond the borders of the State. It is dated November 26, 1935, and I offer it as showing the knowledge upon the part of the respondent of the facts therein stated, and as showing the statement of facts upon which the opinion, which is Exhibit No. 48, was rendered. And I make this showing in order to establish the scope of the facts brought to the attention of Mr. Thoms on which his opinion was rendered.

Mr. Branch: Well, it doesn't seem to me that any of that makes it material. I don't see how Mr. Thoms' opinion is material in this case anyway. It has been admitted, I judge it, for very limited purposes, and I consequently think that is not made admissible by anything counsel for the Commission has said. I object.

Trial Examiner: It does appear, however, that this letter [*1300*] makes something of a statement of what connections there were at a certain time. As such, it will be admitted for whatever it is worth as Exhibit 50.

Mr. Branch: May I note my exception?

Trial Examiner: Exception will be noted for the respondent.

* * * * * * [*1303*]

Q And since August 26, 1935, the electric energy which the Connecticut Light and Power Company has received from the Connecticut Power Company at Bristol has been received under these contracts, Exhibit 51 and Exhibit 8 successively? *A* Yes, except as they may possibly have been modified slightly as to perhaps price, or one thing or another of that kind, by letters of which, however, I have no recollection.

* * * * * * [*1306*]

Q Are there any other modifications that you know of aside from Exhibits 9 and 10? *A* None that I know of, but I want to say this: We have a great many contracts. I am generally famil-

iar with them, but I find it difficult to be familiar with all of them in great detail. My recollection was that yesterday when I was under cross examination I had forgotten about this letter and I testified that Exhibit 8 was the contract that was in effect, and then was confronted with this letter, and I frankly hate to be submitted to a memory test because I haven't got a good memory, and I have already indicated that by having made some mistakes and admitted them. So that I have a general knowledge of these matters, although I don't execute them myself. I have talked with our officers about them, and they go ahead and carry them out.

Q So far as your present recollection goes, Exhibits 8, 9 and 10 represent the contract under which electric energy is being delivered up to the present time at Bristol? [*1307*] *A* Yes.

Mr. Wahrenbrock: Mr. Examiner, I offer Exhibits 8, 9 and 10 for Identification, in evidence.

* * * * * * [*1311*]

By Mr. Wahrenbrock: *Q* Mr. Campbell, is the Connecticut Light and Power Company considering any changes in its source of supply of electric energy at Bristol?

* * * * * *

A It is rather difficult to answer that question specifically, I mean directly. As I said when I was on the stand before, our Company is constantly, from time to time, reviewing the matters that are up in connection with the supply of power or procurement of any materials or services that we may need, [*1312*] with the hope that we may be able to find some more satisfactory way. Whether there is any active study going on now of this Bristol supply, I don't think there is. It is likely, however, that it would be studied, because if it should develop that it is economical, more economical for us to obtain our supplies from our own system, and assuming that it is feasible and practicable to do so, we would naturally desire to do so upon the termination of this contract.

To bring that about would require a determination on our part

of the proper steps to be taken quite some time in advance of the actual date of the termination of the contract, so that we could do the necessary things that would be required to be done in order to bring the change about, if it is a desirable change to make.

Q Is any such study being made at the present time? *A* None actively that I know of. It has been discussed from time to time over a period of years, that we might find it advantageous to do so at some time. We own no right-of-way which would enable us to do so, and the procurement of a right-of-way takes quite a long time, so the matter is not being actively studied at the present time.

* * * * * * [*1329*]

The Witness: Commission counsel asked me if we were considering any change in our methods of operation at Bristol, and I answered no. And that is true, but I did want to explain, because I didn't want to have any misunderstanding. The contract at Bristol provides that a two-years' notice shall be given for its termination, which notice must be given before some date—I think it is the end of 1944, and we have felt that that contract has certain disadvantages in it to us, which we feel in the renewal of a contract we would like perhaps to have changed. It has nothing to do with this question involved here of interstate commerce, and we therefore have considered—we have considered from time to time whether it would be feasible or practicable for us to introduce our own supply of power. So, preliminary to being ready to sit down some time in the future, the next two or three years, and knowing that it takes a very long time to secure a right of way, we are now studying the feasibility of securing a right of way. We are actively engaged on that merely for the purpose of putting us in a good trading position when the termination of the present contract comes. I wanted to correct that so that there would be no misunderstanding.

[*1330*] By Mr. Wahrenbrock: *Q* Do you want to augment that statement you have just made with any statement as to the pur-

poses to which you referred—purposes which you referred to as unconnected with matters here under consideration? *A* Purely economic ones. We had felt for some time that the terms and conditions under which we are in this present contract, with the Connecticut Power Company, are burdensome, and we have felt therefore that we would be in a better trading position if we are then, when that time arrives, in a position to introduce our own supply, if we are unable to make what appears to us favorable and satisfactory terms.

* * * * * * [1333]

Q Mr. Campbell, you have previously testified to the reason for the company's disconnections of the New Britain interconnection in 1936 when the Connecticut Power Company reestablished its interstate connections. Would that reason have impelled the Company to make that disconnection if by maintaining the connection it would not be subject to Federal Power Commission jurisdiction?

* * * * * * [1334]

The Witness: Well, as the Company disconnected from the Connecticut Valley Exchange because of the possible interstate complications involved, if the interstate complications were removed by some subsequent action, I would expect the Company would have restored the connection. I can't say, because I was not in control.

By Mr. Wahrenbrock: *Q* To use the form of language you have used, would it have been to the Company's interest at the time those interstate complications were removed, to remove the interstate complications at Groton?

* * * * * * [1335]

The Witness: . . . There weren't any at Groton, in my opinion, as I understood the situation at that time, as I then understood the situation.

By Mr. Wahrenbrock: *Q* When did your understanding change, Mr. Campbell? *A* I don't know that it has changed. The change

as I recall it and see it has taken place in the interpretations [*1336*] and rulings of the Federal Power Commission.

As I have said before, at this time that we are speaking of, in '35, the Act was new. It is a complicated Act and certain things were fairly clear and obvious in it. Many other things, perhaps, were not, and as we found the trend of the attitude or interpretation that was apparently being placed on the Act by the Federal Power Commission, we attempted to adjust our situation to meet those interpretations which they were placing on it.

* * * * * * [*1372*]

Cross Examination by Mr. BRANCH.

Q Mr. Campbell, in the course of your testimony you have mentioned Mr. Roraback, former president of the company. Is Mr. Roraback alive now? *A* No, he died in May, 1937.

Q And I think in the course of the testimony mention has been made of Mr. Thoms, W. E. Thoms, was it, of Waterbury—was he a lawyer? *A* Yes, he was a lawyer in Waterbury.

Q And is he alive now? *A* No, he died within, I should say two years.

Q And in the course of these—

Mr. Wahrenbrock: Excuse me. May I have the last answer read? I was unable to hear the witness.

The Witness: Mr. Thoms died within two years.

By Mr. Branch: *Q* I think you stated in your direct testimony that this opinion of Mr. Thoms and Mr. Roraback, or this letter [*1373*] which is Exhibit—well, I will look up the exhibit number. I think you stated in your direct testimony that you had never seen this opinion of Mr. Thoms until recently. *A* That is as far as I remember.

Q And at any time that Fall, did you confer with Mr. Thoms to get his views as to the legal situation in regard to any of those matters ? *A* I didn't hear the first part of your question.

Mr. Branch: Will you read it, please?

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Branch: I will change that.

By Mr. Branch: *Q* At any time during the Fall or early winter of 1935, or during the summer, or say, at any time during the year 1935, did you confer with Mr. Thoms in regard to any of these matters relating to jurisdiction of the Federal Power Commission or the Connecticut Valley Power Exchange? *A* I don't recall ever having done so.

Q And did you confer from time to time with other counsel for the company in regard to these matters? *A* Yes.

Q And who was that counsel? *A* Members of the firm of Day, Berry & Howard.

Q In Hartford? [*1374*] *A* In Hartford. And also Mr. Garfield Scott, and some one or more of his assistants who—Mr. Garfield Scott being general counsel of the United Gas Improvement Company, and we had at that time the right to call on that department, the legal department of the United Gas Improvement Company, for legal advice, with little or no cost to us, so we tried to avail ourselves of that free service.

Q You made reference in one of your answers, Mr. Campbell, when you were giving your reasons for disconnecting at New Britain and removing yourself from the Connecticut Valley Exchange, to those facilities which you felt might possibly be held that you were operating if you continued in the Exchange, and the word "connections". What facilities did you refer to by those facilities? *A* I referred to the lines which were in the control of the Connecticut Valley Power Exchange, extending up to the Massachusetts State line, and perhaps to the New York State line, if that connection was made at that time.

Q Now, in regard to the Connecticut Valley Power Exchange, I think you said in substance that the arrangement was that power which the Exchange took might be sent where the Exchange—or that the Exchange was the one that had control over the sending of that power, is that correct? *A* Yes.

Q And you knew that there were—that there was a line [*1375*] which connected Hartford with Massachusetts, the so-

called Agawam line crossing the Massachusetts State line? *A* Yes.

Q And as I understood it from you, it was contemplated in the arrangement of the Connecticut Valley Power Exchange, that power should be sent by someone along that line from time to time, is that true? *A* Yes.

Q Now, in regard to the Groton situation, was there any agreement on the part of your company at any time to furnish power to Fishers Island, or to any company on Fishers Island? *A* No.

Q Was any customer mentioned in your agreement with the Borough of Groton other than the Borough itself? *A* No.

Q And did you deliver all the power you delivered to the Borough of Groton under your agreement with the Borough of Groton? *A* We did.

* * * * * * [*1377*]

By Mr. Branch: *Q* Mr. Campbell, as far back as you can recollect, up to the time when you received notice of the order to show cause, did the Federal Power Commission or any representative of the Federal Power Commission, communicate to you in any way directly its contention that your company was a public utility within the meaning of part 2 of the Federal Power Act?

Mr. Wahrenbrock: I object to that, Mr. Examiner, as being immaterial. There is no requirement of the statute, no re- [*1378*] quirement of law, that the Federal Power Commission must first have communicated to the respondent any determination before it investigated the facts.

* * * * * *

Mr. Wahrenbrock: Mr. Examiner, it is a proposition of law that has been established as long as the country has had law that no estoppel runs against the Government.

Trial Examiner: That is very true. I think the matter may, however, have some usefulness as an explanation, and may be material to the question raised by Commission's counsel in his opening statement as to the possible request for the invocation of penalties, and we will therefor admit it.

The Witness: I never received any communication from the Federal Power Commission denying the statement which I had made [*1379*] to them several times that we were not a public utility and not subject to their jurisdiction.

Mr. Wahrenbrock: I move the reply to the question be stricken. It is immaterial what letter Mr. Campbell received.

Mr. Branch: I will follow that with a further question.

By Mr. Branch: *Q* As far as you know, did anybody representing the Federal Power Commission write any letter to your company or to any officer of your company at any time prior to the time when the order to show cause in this proceeding was served upon you, asserting that your company was a public utility within the meaning of part 2 of the Act?

Mr. Wahrenbrock: Mr. Examiner, there is already in the record evidences by Exhibits and by stipulation showing many communications from the Federal Power Commission to the respondent, serving orders upon it, addressed to public utilities.

Trial Examiner: That fact of itself does not make the testimony irrelevant. It will be admitted. You may answer the question.

The Witness: No.

* * * * * * [*1382*]

By Mr. Branch: *Q* Let me ask you this: Mr. Campbell, when you first opened negotiations recently with an officer of the Torrington Electric Light Company, which resulted in the oral agreement which you have mentioned, to obtain power from the Torrington steam plant, what was the condition of the Torrington steam plant?

Mr. Wahrenbrock: Mr. Examiner, I object to that. No basis has been laid. The witness hasn't been qualified as an engineer, hasn't been qualified that he has ever seen the plant or knows anything about it.

Mr. Branch: I don't mean a detailed explanation. I just want to know whether it was operating or getting ready to operate.

Trial Examiner: I think from that standpoint the question is admissible.

Mr. Wahrenbrock: If he knows.

Trial Examiner: With that qualification, you will answer the question.

A The Torrington steam plant had been a reserve plant held in reserve by the Torrington Electric Company for a number of years. It was included in the description of facilities of power plant capacity available for load carrying purposes [*1383*] at the conferences that were had with the War Power Committee presided over by Mr. Olds, in December, 1939. Some time ago, within a year, the Torrington Company had apparently concluded to put in an additional boiler to make that plant still more useful to it, and when I say the Torrington Company, in respect to the arrangement that is now in effect, that new boiler had been installed, but it had not perhaps been fully completed in its installation. It was not quite ready for operation, but the plant had been tuned up, looked over and was in operating condition.

Mr. Wahrenbrock: Mr. Examiner, I move that that answer be stricken, it not having been shown how Mr. Campbell obtained his information, and it appearing from all of his other testimony that he knows nothing about the facilities of any other company except his own and has no duties with respect to the facilities of any other company than his own, and can't remember anything about the facilities of any other company except his own, doesn't know whether there are any other facilities of any other company than his own.

Trial Examiner: He has stated, I believe, that he handled these negotiations. I think, perhaps, he may explain the source of his information.

The Witness: The source of the information came to our engineering department, first it came to our engineering department at the time they were compiling for this War Power Committee the [*1384*] facilities available. It was furnished by the operating department of the Torrington Electric Light

Company, to our engineering department. I saw the report, attended the conference at which the statement was made, and at which it was accepted as available capacity to the extent of 2,500 kilowatts. And I saw Mr. Travis, and I asked him if it were a fact that he had recently been overhauling his plant and installed a new boiler, so that it was now in better condition than it had been before, and able to carry our load at Winsted, and he told me that it was.

By Mr. Branch: *Q* Who is Mr. Travis? *A* He is the president of the Torrington Electric Light Company.

* * * * * * [1386]

Mr. Wahrenbrock: I will be glad to abide by the suggestion, and may the record show this is redirect? Before beginning the redirect, however, I wish at this time to ask the respondent's counsel to produce the matters concerning which he claims privilege, which are called for by the subpoena directed to the respondent, which is outstanding.

Mr. Branch: Well, that is generally a large order. Will you specify what you want?

Mr. Wahrenbrock: Everything called for by the subpoena which you have not thus far made available to me.

Mr. Branch: May I confer with my associates?

Trial Examiner: You may.

* * * * * * [1387]

Redirect Examination by Mr. WAHRENBROCK.

Q In the year 1935, at the time you were consulting with Day, Berry and Howard, and Garfield Scott, with respect to questions of Federal Power Commission jurisdiction, who owned the electric lines and facilities from New Britain interconnection with your company to the Massachusetts-Connecticut boundary?

Mr. Branch: Who owned what? May I have that question read?

Trial Examiner: The reporter will read the question.

(Question read by the reporter.)

A I think it was the Connecticut Power Company.

By Mr. Wahrenbrock: *Q* The Connecticut Light and Power Company didn't own those facilities? *A* No, not those facilities.

[*1388*] *Q* Did the Connecticut Light & Power Company maintain those facilities? *A* Again as of what date?

Q 1935. *A* Before or after the—

Q Either one. If it is different, answer differently for the portions of the year. *A* Prior to August 25th, if that is the date when the Federal Power Act went into effect, prior to that date the facilties were maintained, as I remember it, by the Connecticut Valley Exchange, and the Connecticut Light and Power Company as a member of that Exchange participated therefore directly or indirectly in that maintenance. After that date, the situation then remained the same, because the connection had been cut at the Massachusetts State Line, and that condition continued until early in 1936 when the reconnection was established at the Massachusetts State Line, and connection was broken at the New Britain point.

Q Up to approximately August 25 or 26, 1935, did the Connecticut Power Company receive a payment for the use of the lines? *A* I think they did from the Exchange, but I can't be sure. It is six years ago, and I don't carry those details in my mind.

Q I show you Exhibit 41, which is a contract between the [*1389*] Connecticut Power Company, the Hartford Electric Light Company and the Connecticut Light and Power Company, made as of the first day of January, 1931, and bearing your signature as a witness, and ask you whether, under the terms of that agreement and Article I, which reads:

> "The transportation company agrees to transmit over said transmission lines such amounts of electric energy as may be desired from time to time by the power companies, up to the capacity of said line."

And I ask you whether in view of that provision it wasn't the Connecticut Power Company that operated the Hartford-Agawam

line? *A* Apparently it was, and I would like to just explain that at the time that this contract was made, and at the time, the date as of which you were speaking, in '35, I was a vice-president of the company, particularly charged with the financial accounting and corporate features of the company, not directly connected, or had no responsibility about the plants and facilities and matters of that kind. On matters of general policy, as one of the cabinet, perhaps, if I might refer to it, I was consulted and took part in the discussions relating to that, but I witnessed this merely as I happened to be able to write, and was near at hand.

By Mr. Wahrenbrock: [*1390*] *Q* Mr. Campbell, in fairness, and to keep the record straight, shouldn't some of the statements you made about operation of the lines by the Exchange be withdrawn? *A* In the light of this contract, I should say that clearly my recollection was at fault.

Q The facilities were not operated by the Exchange but by the Connecticut Power Company? *A* Yes, I should say that is true.

* * * * * * [*1391*]

Mr. Branch: In response to the request of counsel, I hand him the following opinions:

From W. E. Thoms, addressed to Irvin W. Day, dated April 16, 1936.

Opinion of W. E. Thoms, dated April 16, 1936.

Copy of an opinion—we don't find the original, but we find a copy from Day, Berry & Howard, to Mr. Campbell, dated April 21, 1935—no, I correct that. That is October 21, 1935.

A letter from Garfield Scott to R. H. Knowlton, vice-president of the Connecticut Light and Power Company, dated April 27, 1935, with voluminous memoranda.

An opinion signed by Garfield Scott, Day, Berry & Howard, by Lawrence A. Howard. It is printed, and dated September 16, 1936.

An opinion of Day, Berry & Howard, dated March 25, 1941, [*1392*] which is mimeographed.

I am also advised that we do not have here one other opinion which is very similar to the opinion of September 10, 1936. We thought it was here, but apparently it is not, and I want to make that statement because we supply this. Mr. Howard tells me his November 24, 1936—I am informed that it is the same as the September 10th opinion, but it apparently was rendered for some reason or other.

I have a very large number of bills of counsel, which includes some items within the description of the matter relating to the subpoena. I cannot see that bills of counsel have any possible materiality, and consequently I am not handing those to counsel for the Commission.

I think that the subpoena duces tecum also asks for journal entries, for expenditures incurred in legal services. There are attached to it, I think in the case of each bill, a voucher copy, which I suppose is the same as the journal entry, but obviously I haven't the journals themselves here.

I also hand counsel the opinions which I have mentioned.

(Documents were handed to Mr. Wahrenbrock.)

Mr. Wahrenbrock: I have received what appear to be six documents, Mr. Examiner.

* * * * * * [*1400*]

Mr. Wahrenbrock: Mr. Examiner, in the few minutes, since we recessed, I have looked over these six legal opinions which were handed me by respondent's counsel at the conclusion of yesterday's session, last night's session. I have not in that time had an opportunity to have copies prepared. I should like to introduce for identification and to offer in evidence, copies of each, except the opinion dated April 27 by Garfield Scott, with its attachments, and with respect to that, I would like to introduce that opinion of one page and the five page opinion attached thereto, by K. B. Anderson, which precedes the fifty-three page memorandum by K. B. Anderson.

* * * * * * [*1401*]

Mr. Wahrenbrock: I hand the reporter for identification as

Exhibit 54, and a copy to the Examiner, the respondent having retained copies, and I having a copy, an opinion dated March 25, 1941, signed "Day, Berry & Howard", and addressed to the Connecticut Light and Power Company, 36 Pearl Street, Hartford, Connecticut.

Trial Examiner: It will be marked as Exhibit No. 54 for Identification.

(The document referred to was marked as Exhibit Number 54 for Identification.)

Mr. Wahrenbrock: I now hand the reporter and the Examiner and retain for myself copies of an opinion with reference to Public Utility Act of 1935, dated September 10, 1936, addressed to The Connecticut Light and Power Company and signed Garfield Scott, Day, Berry and Howard, by Lawrence A. Howard, and ask that it be identified as Exhibit No. 55.

[*1402*] Trial Examiner: The document will be marked Exhibit No. 55 for Identification.

(Document referred to was marked as Exhibit Number 55 for Identification.)

Mr. Wahrenbrock: Mr. Examiner, I am going to ask that each of the other four opinions which I will refer to be marked for identification, with leave to withdraw and substitute photostatic copies.

Trial Examiner: It will be so ordered.

Mr. Wahrenbrock: I would like to have the opinion dated April 16th, 1936, addressed to Mr. Irvin W. Day, The Connecticut Light and Power Company, and signed by Carmody & Thoms, by W. E. Thoms, marked for identification as Exhibit 56.

Trial Examiner: It will be marked as Exhibit 56 for Identification.

(Document referred to was marked Exhibit Number 56 for Identification.)

Mr. Wahrenbrock: And I hand Exhibit 56 for Identification to the respondent's counsel and would like to ask that the opinion dated May 27, addressed to The Connecticut Light and Power

Company, signed Carmody & Thoms, by W. E. Thoms, be marked for identification as Exhibit Number 57.

Trial Examiner: Will counsel state what year? I think that should appear upon the record.

Mr. Wahrenbrock: Under date of May 27, 1936.

[*1403*] Trial Examiner: The document will be marked Exhibit 57 for Identification.

(Document referred to was marked as Exhibit Number 57 for Identification.)

Mr. Wahrenbrock: I hand Exhibit 57 for Identification to respondent's counsel. I ask that the signed carbon copy dated October 21, 1935 of an opinion addressed to Mr. C. L. Campbell, Vice President, The Connecticut Light and Power Company, signed by Day, Berry & Howard, be marked for identification as Exhibit Number 58.

Trial Examiner: The document will be marked as Exhibit Number 58 for Identification.

(Document referred to was marked as Exhibit Number 58 for Identification.)

Mr. Wahrenbrock: Finally, I ask that the entire document, of which the first page in the form of a letter under date of April 27, 1935, addressed to Mr. R. H. Knowlton, Vice President, The Connecticut Light and Power Company, and signed by the United Gas and Improvement Company, Garfield Scott, General Counsel, together with the attachments thereto, under date of April 25, 1935, headed "The Connecticut Light and Power Company, Interstate Commerce, Mr. Garfield Scott:" and consisting of five pages, with the name "K. B. Anderson" at the end, together with the further attachment headed "Are Gas and Electric Companies Engaged in Interstate Commerce?" [*1404*] under date of April 24, 1935, and according to its pagination consisting of 53 pages, at the end of which appears the name of K. B. Anderson, be marked as a whole for identification, as Exhibit Number 59.

Trial Examiner: The document will be marked as Exhibit No.

59 for Identification. It appears necessary that the whole be introduced?

Mr. Wahrenbrock: No, sir. Having the whole marked for identification, I will have a further statement to make when it has been marked.

Trial Examiner: All right.

(Document referred to was marked as Exhibit Number 59 for Identification.)

* * * * * * [1405]

By Mr. Wahrenbrock: *Q* Mr. Campbell, you have heard described the six legal opinions which have been marked for identification as Exhibits 54 to 59, inclusive just now? *A* I have.

Q And I show you Exhibit 48 for Identification. Are those seven legal opinions so described all of the legal opinions which The Connecticut Light and Power Company, or any officer acting as an officer of the company, has received which recommend, discuss, or directly relate to or concerns any of the eight matters enumerated under paragraph 1 of the subpoena which was served upon the Connecticut Light and Power Company in this proceeding? I show you a copy of that part of the subpoena. *A* As far as I know, yes, excepting as they may have been supplemented from time to time by oral discussions of which, I presume, there may be no record.

* * * * * * [1406]

Mr. Wahrenbrock: Mr. Examiner, I would like at this time to offer each of those opinions, Exhibits 54 to 59 inclusive, in evidence, on the understanding that copies will be subsequently provided.

* * * * * * [1407]

Trial Examiner: Is there objection to their introduction in evidence?

Mr. Branch: No, sir. In view of the fact that a good deal of this matter has been gone into, I make no objection.

Trial Examiner: All right. I think with the exception of No.

59, they will now be received in evidence, and I think on account of the matter of pagination, that only a part of it is proposed to be marked later, that it is better not to show that on the record as a whole until we—

Mr. Wahrenbrock: My offer is of the part which I designated for copy.

Trial Examiner: Counsel has stated that he has no objection to the admission, so that the delay in the admission is simply for the purpose of having the record straight on the pagination. Therefore Exhibits 54, 55, 56, 57, and 58 [*1408*] are now admitted in evidence.

(The documents referred to were marked as Exhibits Nos. 54, 55, 56, 57 and 58 in Evidence.)

* * * * * * [*1409*]

Q Mr. Campbell, I show you Exhibit 35 for Identification, and ask you whether the savings realized from the operation of the Connecticut Valley Power Exchange, which you testified the Connecticut Light and Power Company ceased to share in after August 25th or 26th, 1935, had resulted in net payments to The Connecticut Light and Power Company of the sums shown on that exhibit for the preceding twelve months.

Mr. Branch: I object at this place. I think that this question was asked of some other witness and was ruled to be immaterial. And in the second place, this is not a matter that was gone into in my examination, and has no proper place.

Trial Examiner: I do not recall this question having been raised in the past examination, Mr. Wahrenbrock, or anything similar to bring it in. I doubt if the question is—

Mr. Wahrenbrock: Mr. Examiner, I don't see that any [*1410*] substantial—I don't see that any unfairness would be accomplished, and in view of the conditions under which I have been examining Mr. Campbell, I should suppose it would be only fair to permit a certain laxity. After all, the rules for confining the subsequent redirect to the limitations of the cross were for the

purpose of preventing undue prolongation of the examination of a single witness, and I think it is obvious I have been making every effort to conclude the examination of this witness.

Trial Examiner: With that in view, I think we will permit the question, which of course verges very dangerously on that situation. Counsel has stated very definitely the purpose, and it is understood that it in no way presses for any further question. You may answer the question.

The Witness: Well, sir, I don't carry in my mind the precise figure. My recollection is that it was some figure somewhere about that, and I have no reason to doubt the correctness of that figure. But I would like to make one other statement. We did not cease to participate in the Connecticut Valley Exchange in August, 1935. We continued to enjoy and participate in such benefits as there were from the operation of the Connecticut Valley Exchange, confined merely to the State of Connecticut until—I think it was early in 1936, so that it wasn't—we enjoyed during that period the same or some substantial part of the same savings.

[*1411*] *Q* After August 26th, 1935, the Turners Falls Company—I can't at the moment recall its exact corporate name—you are familiar with the company I am referring to—which had previously been a member of the Exchange and participated along with the Hartford Company and your Company, no longer participated, did it? *A* That is right.

Q And any savings which might have been realized by subsequent exchanges of power were not realized by the arrangement under which savings had previously been realized? *A* No, they were confined entirely to operations of the Connecticut companies within the State of Connecticut.

Q Yes. And after the severance of the New Britain interconnection in 1936, except for such reconnections during emergencies as may have occurred, there were no further savings from exchanges with the Hartford Company? *A* That is right, sir.

* * * * * * [*1413*]

Mr. Wahrenbrock: Mr. Examiner, I now offer in evidence in order Exhibits 32 for Identification, 33 for Identification and 34 for Identification, of which I will have copies prepared at the earliest opportunity. So far as 32 and 33 are concerned, I expect I will have copies of those within a day or two. So far as 34 is concerned, I shall have to have a photostat made which I will do promptly upon my return to [*1414*] Washington, and I will then furnish the required number of copies.

Mr. Branch: I object to these on the ground that they are immaterial and in respect of Exhibit 33 I also object on the ground that it is privileged, as I explained when the matter was first referred to, or at some time when the document was referred to yesterday.

Trial Examiner: I believe this letter is addressed to Mr. Roraback by W. E. Thoms, and the evidence shows that it was received from the Hartford or Connecticut Light Company—which was it?

Mr. Wahrenbrock: It was produced in response to the subpoena directed to The Hartford Electric Light Company and The Connecticut Power Company and Mr. Samuel Ferguson.

Trial Examiner: This matter was not, when called for, in the possession of the respondent. There is no suggestion that there was any—

Mr. Branch: (Interrupting) May I see those?

Mr. Wahrenbrock: I show them to respondent's counsel.

Mr. Branch: I think I have stated my objection, sir.

Trial Examiner: Does that complete your objection, Mr. Branch? Has your objection been fully stated?

Mr. Branch: Yes, sir. The privilege was claimed in behalf of everyone.

Mr. Wahrenbrock: Well, Mr. Examiner, I object to that [*1415*] statement. Privilege can only be claimed by Mr. Branch on behalf of his client.

Trial Examiner: The question of privilege is one which has

been plaguing us considerably during this hearing, and it is apparent in this case, however, that the documents were produced from the possession of the third party and would thus be practically, in the case of communications orally made in the presence of the third party. Documents marked for identification as Exhibits 32, 33 and 34, will be received in evidence. It will be further noted that there is no allegation made that the opinion in question was surreptitiously obtained by the parties in whose hands it was.

* * * * * * [*1421*]

HAROLD E. MILLER,

a witness called on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Will you please state your name and address. *A* Harold E. Miller, 5 East Oxford Avenue, Alexandria, Virginia.

Q What is your occupation? *A* I am an electrical engineer.

Q What was your professional schooling? *A* I was graduated from Cornell University, degree of electrical engineering.

Q What is your position with the Federal Power Commission? *A* I am employed by the Federal Power Commission as an assistant electrical engineer.

Q How long have you been with the Federal Power Commission? [*1422*] *A* I have been employed by the Federal Power Commission since May, 1939.

Q Will you describe your duties? *A* I assemble engineering data and make the necessary studies which enable me to prepare preliminary drafts of engineering reports of electric utilities. In connection with this work, I study the operations of their systems, including loads and output of their generating stations, their wholesale energy transactions, and demands and energy consumption of their transmission networks and substations, to determine the direction and amount of energy flow over their lines, and

through their substations. I make field investigations, check operating data, and observe facilities and methods of operation whenever necessary. I prepare exhibits, tabulations, and data for use at hearings conducted under the authority of the Commission.

Q Have you made a study of the supply of electric energy to the electric utility system on Fishers Island in the State of New York, and to electric utility systems of the Connecticut Light and Power Company located at and near East Hampton, Bristol and Winsted, Connecticut, respectively? *A* I have.

Q What periods of time did that study cover? *A* In general, the period of time from the passage of the Federal Power Act to date was covered. More extensive [*1423*] study was made of the operations since 1937.

Q What data was utilized in that study? *A* Log sheets of The Connecticut Valley Power Exchange and Housatonic division of The Connecticut Power Company, photostats of R.A. and printometer charts from meters at Torrington, tabulated and other data from The Connecticut Power Company, The Torrington Electric Light Company, The Connecticut Light and Power Company, and The Hartford Electric Light Company; annual reports, power system statements, and other reports of The Connecticut Light and Power Company, The Connecticut Power Company, The Hartford Electric Light Company, The Torrington Electric Light Company, the Borough of Groton Utilities, the Western-Massachusetts companies. From this group combined power system statements were consulted, but these companies report separately in their annual reports.

Also power system statements and annual reports of the Fishers Island Farms, Incorporated, and of other companies. The FPC files of The Connecticut Valley Power Exchange, The Connecticut Light and Power Company, Fishers Island Farms, Incorporated, their application to sell properties to Fishers Island Electric Corporation, information obtained orally from engineers, executives, and operating men of The Connecticut Power Company,

The Connecticut Light and Power Company, and The Hartford Electric Light Company.

I have made two field trips in respect to this matter, [*1424*] one of five days, and the other, I believe, of eight days.

Q In your statement you have referred to "R.A. charts". What do you mean by R.A. charts? *A* R.A. charts are charts drawn by a curve drawing meter, which enable determination of the demand during certain definite periods, such as fifteen minutes or thirty minute periods.

Q You refer to FPC files. Will you explain what you meant by FPC files? *A* I was referring to the files of the Commission which are available to me in my work.

Q Did you view or study any of the facilities involved? *A* Yes.

Q Will you generally describe the extent of your field investigation? *A* I have visited the South Meadow, West Side, Thomaston, Torrington, and Falls Village substations of The Connecticut Power Company, various points in the Middletown division of The Connecticut Power Company, and the Falls Village generating plant of The Connecticut Power Company. I have visited the Bristol, Winsted, and Torrington substations of The Connecticut Light and Power Company. I have also visited Gaylordsville, Thomaston, Putnam, and other points in The Connecticut Light and Power Company system. I visited the substation of The Torrington Electric Light Company. I also [*1425*] visited the substations at Groton and Groton Long Point, and other points in Connecticut. I viewed the CP-1 and CP-2 lines at various points between Hartford and Falls Village.

Q What do you mean by the CP-1 and CP-2 lines? *A* Those are lines extending from the South Meadow substation of The Connecticut Power Company to the Falls Village generating plant at Falls Village.

Q And where is the South Meadow station of The Connecticut Power Company to which you have referred? *A* The South Meadow substation of The Connecticut Power Company is in

Hartford, you might say adjacent to the South Meadow plant of The Hartford Electric Light Company.

Q In stating the results of your study, is it convenient for you to group the various systems or parts of systems of The Connecticut Light and Power Company? *A* Yes. East Hampton, Bristol, and Winsted operations of The Connecticut Light and Power Company can be conveniently grouped together as they have a common source of supply from the Connecticut Power Company, CP-1 and CP-2 lines. The operations involved in the Borough of Groton are separate and distinct from these.

Q Will you describe all the sources of supply of electric energy within the State of Connecticut from which the electric energy requirements of Bristol, East Hampton, and Winsted districts could be supplied with the then existing [*1426*] facilities during the period covered by your study. In making that description, I would like to ask, will it be convenient for you to refer to a diagram? *A* Yes. I have a diagram.

Q Will you produce it, please? *A* (Handing document to counsel.)

Q Thank you.

Mr. Wahrenbrock: I hand the respondent's counsel a sheet of paper which bears the legend, "One line diagram". I hand a copy to the Examiner, and I ask that the other copy be marked for identification as Exhibit No. 60.

Mr. Branch: Have you additional copies of this that you can supply to us? It is going to be rather difficult for all of us to follow this on this one small sheet.

By Mr. Wahrenbrock: *Q* Have we any other copies of this, Mr. Miller? *A* I did have one more, but I have been unable to locate it.

Mr. Wahrenbrock: I have only the one copy for myself. It was an oversight on my part. I hadn't anticipated your necessities.

The Witness: I have a negative that you could make some additional positives, somewhere in my papers, I believe.

Mr. Branch: It would be a great—apparently this is something that is going to be referred to in his testimony, [*1427*] and naturally it is a little difficult for all of us to look at this one small sheet.

Mr. Wahrenbrock: Can the witness be excused long enough to find the negative which I will be glad to loan to respondent's counsel?

Trial Examiner: We will take a five-minute recess.

(At this point a short recess was taken, after which the hearing was resumed.)

[*1428*] Trial Examiner: The hearing will now be in order.

Mr. Wahrenbrock: I hand respondent's counsel another positive.

Mr. Branch: Thank you.

Mr. Wahrenbrock: I ask that the copy I have handed the reporter be marked for identification as Exhibit Number 60.

Trial Examiner: It will be marked Exhibit Number 60 for Identification.

(Document referred to was marked Exhibit Number 60 for Identification.)

By Mr. Wahrenbrock: *Q* I place Exhibit Number 60 for Identification before you, Mr. Miller, and ask you if that exhibit was prepared in accordance with your instructions and under your direction? *A* It was.

Q With that exhibit before you, will you describe all the sources of supply of electric energy within the State of Connecticut from which the electric energy requirements of the Bristol, East Hampton and Winsted Districts of The Connecticut Light and Power Company could be supplied with the then existing facilities, during the period covered by your study?

Mr. Branch: Will you read just the first part of that question, please?

Trial Examiner: Will the reporter read back the question?

(Question read by the reporter.)

[*1429*] Mr. Branch: May we state as of what date?

Mr. Wahrenbrock: Yes, during the period covered by his study, which has been fixed. *A* The Falls Village Electric Plant of The Connecticut Power Company and the plants of The Hartford Electric Light Company were sources of supply of Connecticut-generated energy in the Bristol District, the Winsted District and prior to July 1, 1939, the East Hampton District. Referring to the diagram, the Falls Village plant is shown at the left hand side of the diagram marked at the point where it is marked "Falls Village Plant and Substation". The plants of The Hartford Electric Light Company are not shown on the diagram but on the right-hand side of the diagram there is an 11 kv. bus at South Meadow, of The Hartford Electric Light Company indicated. In addition to these sources, the Robertsville hydro-electric plant of the Connecticut Light and Power Company, and prior to September, 1938, the Leesville Hydro-electric Plant of The Connecticut Light and Power Company were sources of supply of Connecticut-generated energy to Winsted and East Hampton Districts, respectively. The Robertsville plant is shown on the top of the diagram. None of the facilities in the East Hampton District are shown in this diagram, but the East Hampton District was connected to The Connecticut Power Company's lines at the point marked [*1430*] "To Portland".

Trial Examiner: Will you repeat that?

The Witness: The East Hampton District of The Connecticut Light and Power Company was connected to The Connecticut Power Company lines at a point approximately where it says "To Portland" in the lower part of the diagram.

Trial Examiner: Thank you.

The Witness: An industrial customer of The Connecticut Light and Power Company was also the source of a small amount of energy to The Connecticut Light and Power Company in its East Hampton District. The steam plant of The Torrington Electric Light Company could possibly have been a source of supply to the

Winsted District, although it apparently was not used even in the face of the disasters of 1936 and 1938.

By Mr. Wahrenbrock: *Q* Will you describe in a general way the electric facilities by which those sources have been connected to those loads? *A* The Connecticut Power Company owned and operated a 66 k. v. double-circuit three-phase transmission line from Hartford to Falls Village, known as the C. P. 1 and C. P. 2 lines. These lines are indicated on the diagram in about the center of the diagram and they are marked C. P. 1 and C. P. 2. These lines terminated at the west end in the Falls Village [*1431*] Substation and at the east end in the South Meadow Substation in Hartford. They were tapped to supply energy to the Middletown Division of The Connecticut Power Company, to Bristol District of The Connecticut Light and Power Company, to the Thomaston Division of The Connecticut Power Company and to The Torrington Electric Light Company at Torrington. At Falls Village a single-circuit line, known as the E-line, extended to the New York border, where it interconnected with the line of the Central Hudson Gas & Electric Corporation, The Falls Village plant of The Connecticut Power Company was connected to the C. P. 1 and C. P. 2 lines through the Falls Village Substation. The Hartford Electric Light Company was connected to the C. P. 1 and C. P. 2 lines through the South Meadow Substation. Prior to July 1, 1939, the East Hampton District of The Connecticut Light and Power Company was supplied from a 13.8 k. v. circuit at a point in Portland known as Pole No. 110. This 13.8 k. v. circuit extended from the West Side Substation of the Middletown Division, which, as I have just stated, received energy from a tap from the C. P. 1 and C. P. 2 lines. The Bristol District of The Connecticut Light and Power Company received its entire electric energy supply from the C. P. 1 and C. P. 2 lines. During the period of time covered by my study, the Win- [*1432*] sted District of The Connecticut Light and Power Company got greater part of its electric energy from The Torrington Electric Light Company, which in turn got all its

electric energy requirements from the C. P. 1 and C. P. 2 lines, except for a small amount from the Winsted District at times. The energy was received at the Torrington Substation of the Connecticut Power Company, where the voltage was stepped down from 66 k. v. to 2.3 k. v. for the supply of The Torrington Electric Light Company's service area and for the sale by The Torrington Electric Light Company to the Winsted District of The Connecticut Light and Power Company. The Connecticut Light and Power Company owned a substation at Torrington at which it stepped up the voltage so that the energy received from The Torrington Electric Light Company was transmitted to Winsted at 27.6 k. v. During good water season, the Winsted District received some energy from the Robertsville Plant of the Winsted District.

Q Will you please describe all other sources of supply of electric energy from which the requirements of the Winsted, Bristol and East Hampton systems could have been supplied, during the period of time covered by your study, with the then-existing facilities, in a general way?

Mr. Branch: I object on two grounds. One is that it does not appear that we contracted for any such source of supply, or that The Connecticut Power Company contracted.

[*1433*] Secondly, it does not appear yet that this witness has sufficient knowledge in order to make a statement of that kind.

Mr. Wahrenbrock: Mr. Examiner, the fact that there is no present existing contract under which the energy received was received is, as I have argued earlier, entirely immaterial. There need not be a pre-existing contract to sell goods which are actually sold in interstate commerce, or to sell services which are actually sold in interstate commerce, prior to the actual sale, in order that the sale in interstate commerce shall be a sale in interstate commerce. With respect to the second point, the witness has stated that he has made a study of the transactions and the facilities, and we shall develop what that study showed.

Mr. Branch: Well, certainly he should first develop what his

study showed, and it may then become more apparent or less apparent that he is in a position to answer this question.

Trial Examiner: I think his general statements of his knowledge will serve for the present, and the objection is overruled and the question may be answered.

By Mr. Wahrenbrock: *Q* Will you answer the question, Mr. Miller? *A* The plants of the Turners Falls Electric Company and its affiliated companies in Massachusetts and other companies [*1434*] in Massachusetts with which it is interconnected, also the plants of the Central Hudson Gas & Electric Corporation in New York, and other companies in New York and New Jersey with which the Central Hudson Gas & Electric Corporation is interconnected.

Q Will you indicate by referring to Exhibit 60 the facilities by which energy from those sources could have been supplied?

Mr. Branch: May it be stipulated that my objection runs to this whole line of inquiry based upon the last answer, or matters similar to it, so I won't have to keep interrupting?

Trial Examiner: It will be so understood.

A The Turners Falls Power and Electric Company, owned and operated the 66 k. v. double-circuit line from its Agawam Substation in Massachusetts to the Massachusetts-Connecticut border, where it interconnected with The Connecticut Power Company's lines which extended to the South Meadow Substation in Hartford.

By Mr. Wahrenbrock: *Q* Are those lines that you have last referred to indicated on Exhibit 60 for Identification? *A* The lines are shown on the exhibit, but they are not identified as to which is C-3 and D-4. They are the lines in the upper right-hand corner of the diagram shown extending from beyond the Massachusetts-Connecticut border, down to the [*1435*] South Meadow Substation of The Connecticut Power Company. These lines were known both in Massachusetts and Connecticut as the C-3 and D-4 lines. At the South Meadow Substation two 25,000 k.v.a. autotransformers were provided to adjust the voltage between the C-3

and the D-4 lines, and the C. P. 1 and C. P. 2 lines. The Central Hudson Gas & Electric Corporation maintained at the New York-Connecticut border an interconnection with the E-line of The Connecticut Power Company which extends to the Falls Village Substation of The Connecticut Power Company.

Q Does that complete your reference to Exhibit 60 for Identification? *A* I think so.

Q Will you please describe in a general way the electric—

Mr. Wahrenbrock: I will withdraw that question.

Q Did the sources to which you have referred supply other loads? *A* They did.

Q Can you indicate in general terms what some of those other loads were? *A* The Falls Village plant supplied the load of the Connecticut Power Company divisions along the C. P. 1 and C. P. 2 lines. The Hartford Electric Light Company plants supplied the loads of that company and of the Farmington Valley Division of the Connecticut Power Company, and some of the loads on the [*1436*] C. P. 1 and C. P. 2 lines. The plant of The Turners Falls Power and Electric Company and affiliated companies supplied the load of their own service area and of their wholesale customers.

Q Was the generating capacity of The Torrington Electric Company operated to supply any electric energy to any loads during the period covered by your study? *A* Not to any appreciable extent. The Torrington Electric Company reports generation of zero kilowatt hours in 1936, 1,700 kilowatt hours in 1937, 1,500 kilowatt hours in 1938, zero kilowatt hours in 1939, and 50 kilowatt hours in 1940. The plant was kept as a cold standby by The Torrington Electric Light Company, subject to call by The Connecticut Power Company.

Q What was the capacity of the Robertsville plant, and what is the relation of its capacity and its annual output to the load and annual energy consumption of the Winsted District of The Connecticut Light and Power Company? *A* Its nominal installed capacity is 500 k. w. Its actual capacity is about 30 per cent greater

than that, as shown by records. The plant has no appreciable storage, so that it can operate regularly only during good-water season. At other times its operation is irregular. Since the annual peak load of the Winsted District has varied from 1,200 k. w. for the year 1936 to 2,032 k. w. for the year 1940, it is ap- [*1437*] parent that the plant when operating at full load cannot take care of the peak load. The annual generation at Robertsville, and the net energy for the system of the Winsted District have been respectively 1,743,910 and 5,067,910 kilowatt hours for the year 1936; 2,677,780 and 6,084,980 kilowatt hours for the year 1937; 2,421,300 and 6,092,500 kilowatt hours for the year 1938; 1,622,370 and 7,595,970 kilowatt hours for the year 1939; 1,624,620 and 8,384,820 kilowatt hours for the year 1940. From these figures it is apparent that the Robertsville generation is much too small to take care of the annual energy requirements of the Winsted District.

[*1438*] Trial Examiner: Mr. Miller, do I understand that in each case the first figure is the generation, and the second figure the consumption in the district?

The Witness: It is what we call "net energy" for the system.

Mr. Branch: Excuse me. We had some difficulty in hearing that, even before the train competed with Mr. Miller, and more afterwards. May we have the answer read?

(Whereupon the last two questions and answers as above recorded, were read by the reporter.)

Mr. Branch: May this be off the record?

Trial Examiner: I think it might be well to have it on. Does the respondent's counsel understand the terms used by the witness?

Mr. Branch: I don't understand the term "net energy for the system".

Trial Examiner: Will the witness explain the meaning of that term?

The Witness: That is a term used in the Power System Statement in which the generation of a system and its purchases and

wholesale sales are added or subtracted in proper way, and the net result is the net energy for the system.

By Mr. Wahrenbrock: *Q* Mr. Miller, when you say in a proper way, will you explain which is added and which is subtracted. [*1439*] *A* I realize that. To the generation of the system there is added the wholesale purchases of energy; from the sum of this generation and wholesale purchases, the wholesale sales of the system are deducted. The difference is net energy for the system.

Mr. Wahrenbrock: Is it all right with respondent's counsel if I proceed?

Mr. Branch: Yes. We can now try to get fuller understanding from other sources.

By Mr. Wahrenbrock: *Q* Mr. Miller, do the facts you have referred to indicate that the Robertsville plant was not the exclusive source of electric supply of the Winsted system? *A* Yes.

Q Is the Robertsville plant a dependable source of supply? *A* No. In dry seasons it doesn't operate.

Q Was the Winsted district of the Connecticut Light and Power Company dependent upon electric energy purchased from the Torrington Electric Light Company? *A* Yes. The Winsted district was entirely dependent upon Torrington Electric Light Company for its energy supply, when the Robertsville plant was not operating. Even in good water season the Torrington Electric Light Company supplied part of the requirements of the Winsted district during the heavy load [*1440*] hours of the day. However, in good water season the Robertsville plant system supplied some energy to Torrington during the early morning hours, Sundays, and holidays.

Q Has the Winsted district of The Connecticut Light and Power Company been entirely dependent upon electric energy supplied to it by The Torrington Electric Light Company at times, during the period covered by your study? *A* Yes. The Winsted district of The Connecticut Light and Power Company has been entirely dependent upon electric energy supplied to it by The Torrington

Electric Light Company, at all times when the Robertsville plant was operating. I am unable to state the number of hours the Robertsville plant was operated in any year, due to the omission of The Connecticut Light and Power Company to supply that information in its annual report on FPC form No. 1. However, on the days which I selected for particular studies for other reasons, I found numerous instances of the plant not operating.

Q During the period that Winsted has been securing part or all of its energy requirements from The Torrington Electric Light Company, how were the electric energy requirements of The Torrington Electric Light Company supplied? *A* The Torrington Electric Light Company was supplied by The Connecticut Power Company through its interconnection wih the CP-1 line, which supplied all of The Torrington Electric Light Company's requirements, except for the com- [*1441*] paratively negligible amount which may have been delivered to The Torrington Electric Light Company from the generation of the Robertsville plant.

Q What was the amount of electric energy purchased by The Torrington Electric Light Company for each of the years covered by your study? *A* The Torrington Electric Light Company purchased from The Connecticut Power Company 23,244,000 kilowatt hours for the year 1936; 25,222,000 kilowatt hours for the year 1937; 23,280,000 kilowatt hours for the year 1938; 28,685,000 kilowatt hours for the year 1939; and 31,437,000 kilowatt hours for the year 1940.

Q What was the amount of electric energy received by The Torrington Electric Light Company from the Winsted district of The Connecticut Light and Power Company? *A* The Torrington Electric Light Company received from the Winsted district of The Connecticut Light and Power Company, 154,400 kilowatt hours for the year 1936; 138,400 kilowatt hours for the year 1937; zero kilowatt hours for the year 1938; 60,000 kilowatt hours for the year 1939; and 22,000 kilowatt hours for the year 1940.

Q During the period covered by your study, how were the elec-

tric energy requirements for the Bristol district of The Connecticut Light and Power Company supplied? *A* The Bristol district of The Connecticut Light and [*1442*] Power Company were supplied by The Connecticut Power Company with all its energy requirements through its interconnection with the CP-1 and CP-2 lines.

Q What was the amount of electric energy purchased by the Bristol district of The Connecticut Light and Power Company for each of the years covered by your study? *A* The Bristol district of The Connecticut Light and Power Company purchased from The Connecticut Power Company, 45,927,000 kilowatt hours for the year 1936; 60,107,000 kilowatt hours for the year 1937; 39,804,000 kilowatt hours for the year 1938; 55,280,000 kilowatt hours for the year 1939; and 65,474,000 kilowatt hours for the year 1940.

Q During the period covered by your study, how were the electric energy requirements of the East Hampton district of the Connecticut Light and Power Company supplied? *A* The electric energy requirements of the East Hampton district of The Connecticut Light and Power Company were supplied in part from its interconnection with The Connecticut Power Company at Portland, in part from the generation of its Leesville plant, and to a comparatively small extent from energy delivered to it by an industrial company, the Brownell Company.

Q Does that answer cover any time after July 1, 1939? *A* No. I have limited my study of this district to the period prior to July 1, 1939.

[*1443*] *Q* What was the amount of electric energy purchased by the East Hampton district of The Connecticut Light and Power Company from The Connecticut Power Company for each of the years covered by your study? *A* The East Hampton district of The Connecticut Light and Power Company purchased from The Connecticut Power Company, 3,543,420 kilowatt hours for the year 1936; 2,756,160 kilowatt hours for the year 1937; 3,577,920 kilowatt hours for the year 1938; and 2,258,688 kilowatt hours for the half year ending June 30, 1939.

Q What was the amount of electric energy generated by the Leesville plant for the period of time covered by your study? *A* The Leesville plant generated 1,519,485 kilowatt hours in the year 1936; 2,050,230 kilowatt hours for the year 1937; and 1,548,877 kilowatt hours for the year 1938. This plant was destroyed in the hurricane and flood of September, 1938.

Q What was the amount of electric energy purchased by the East Hampton district from the Brownell Company? *A* The East Hampton district of The Connecticut Light and Power Company purchased from the Brownell Company, 116,250 kilowatt hours for the year 1938; 92,550 kilowatt hours for the year 1937; 115,520 kilowatt hours for the year 1938; and 116,130 kilowatt hours for the year 1939. Note [*1444*] that the figure given for the year 1939 is for the entire year 1939, whereas the figure of purchases from The Connecticut Power Company included only the first six months of 1939.

Q Were you able to ascertain what the amount purchased from the Brownell Company for the first six months of the year 1939 amounted to? *A* I obtained the figures on the purchases from the Brownell Company from the report of The Connecticut Light and Power Company, its annual report, and also the power system statements. I made no effort to secure any information as to the Brownell Company's sales to The Connecticut Light and Power Company for the first six months of 1939.

Q Did either that statement or that report to which you have referred show the amounts by months? *A* Neither the annual report nor the power system statement shows the purchases by months. The figures given therein are annual figures.

Q At what point was energy delivered to the CP-1 and CP-2 lines? *A* Falls Village substation and South Meadow substation. Also, rather infrequently, from Central Hudson Gas & Electric Corporation.

Q Where did the Falls Village substation receive that energy from? *A* The Falls Village hydro-electric generating plant.

[*1445*] *Q* Did the CP-1 and CP-2 lines ever deliver energy to the Falls Village substation? *A* Yes. Whenever the Falls Village plant generation was zero or less than Housatonic division load.

Q Did the Falls Village plant deliver all its generation to the CP-1 and CP-2 lines? *A* No. Part of its generation was used to supply the Housatonic division of The Connecticut Power Company.

Q Where did the South Meadow substation obtain the energy delivered to the CP-1 and CP-2 lines? *A* The Hartford Electric Light Company at South Meadow substation and Turners Falls Power and Electric Company in Massachusetts.

Mr. Branch: I object and ask that the answer be stricken out on the ground no basis for such a statement has been shown.

Trial Examiner: Does counsel for the Commission desire to be heard on that?

Mr. Wahrenbrock: Mr. Examiner, that doesn't require a basis. That is the fact.

Trial Examiner: I think that that may develop.

Mr. Branch: May we have the question and answer read, please?

Trial Examiner: The reporter will read the question for the benefit of counsel for the respondent.

(Whereupon the last question and answer as above recorded, [*1446*] were read by the reporter.)

Trial Examiner: I think there is plenty of basis laid for the witness's statement, as to his qualifications to know the fact. The motion to strike is overruled. Exception will be noted for the respondent.

By Mr. Wahrenbrock: *Q* Were there any other possible sources of supply to the CP-1 and CP-2 lines?

Mr. Branch: The same objection. Objection based upon the same reason that I stated in my motion to strike.

Trial Examiner: The objection will be overruled and exception noted. You may answer the question.

The Witness: Yes. The Torrington plant whose generation has been negligible in the years covered by the study was a possible source of supply. I do not consider the Robertsville plant because its output is considerably less than the total load at Winsted and Torrington.

By Mr. Wahrenbrock: *Q* So that, for all practical purposes, Falls Village and South Meadow substations were the only points through which CP-1 and CP-2 lines received electric energy? *A* Yes.

Q Do the CP-1 and CP-2 lines ever deliver energy to the South Meadow substation? [*1447*] *A* Yes. When the Falls Village generation exceeded the loads of divisions and systems attached to CP-1 and CP-2 lines, and CP-1 and CP-2 lines delivered energy to the South Meadow substation.

Q When you say energy was received by a line from a substation, what do you mean? *A* I mean energy from one or more generating plants was transmitted through a substation to the load supplied by that line.

Mr. Branch: I also ask to have that stricken out on the same ground.

Mr. Wahrenbrock: I submit—

Trial Examiner: The motion to strike is rejected. Exception will be noted. Counsel may proceed with the questioning.

By Mr. Wahrenbrock: *Q* When you say energy was delivered to a substation by a line, what do you mean?

Mr. Branch: May it be stipulated I have an objection to all questions of this nature, without my interrupting?

Trial Examiner: It is so understood.

Mr. Wahrenbrock: Mr. Examiner, if it could be understood, it might be so understood, but there is nothing in common between the objection, or the questions to which objection was previously made, and these questions. Certainly the witness may explain the terminology he uses.

[*1448*] Mr. Branch: Very well. I will object after each question then.

Mr. Wahrenbrock: Suit your own convenience.

Trial Examiner: I think that is a matter for the determination of the Trial Examiner, as to the similarity of questions. Counsel may proceed.

Mr. Wahrenbrock: There is a pending question. Will you read it, please?

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: I mean energy from one or more generating plants was transmitted by a line through a substation to the loads served from that substation.

By Mr. Wahrenbrock: *Q* Do you mean to say that energy comes to rest in a substation or is interrupted in its passage? *A* No. The expression received by or delivered to a substation is convenient to use, and avoids the rather stilted language which a more exact expression would require. We often speak of a train passing through a station at which it does not stop, as just arriving or just leaving the station.

Q Did the South Meadow substation at times receive energy from the CP-1 and CP-2 lines?

Mr. Branch: Same objection.

Trial Examiner: The objection is overruled.

A Yes.

[*1449*] By Mr. Wahrenbrock: *Q* Did the South Meadow substation deliver energy to the C. P. 1 and C. P. 2 lines at times? *A* Yes.

Q Did the South Meadow substation at times deliver energy to The Hartford Electric Light Company? *A* Yes.

Q Did the South Meadow substation at times receive energy from The Hartford Electric Light Company? *A* Yes.

Q What facilities were used during the period of your study, to supply electric energy to The Hartford Electric Light and to receive electric energy from The Hartford Electric Light Company at South Meadow substation?

Mr. Branch: Same objection.

Trial Examiner: The objection is overruled.

A Three 66-11 kv. 3-phase transformers at South Meadow substation which were operated in parallel to interchange electric energy between The Connecticut Power Company and the Hartford Electric Light Company.

Q Will you indicate by reference to Exhibit 60 for Identification, the location of those 3-phase transformers to which you refer? *A* The transformers are indicated on Exhibit No. 60 at the right-hand side of the exhibit. They are the three trans- [*1450*] formers which are shown as being connected to the 11 kv. bus at South Meadow.

Q Have you completed your answer to my question? *A* No.

Q Will you continue? *A* Two of these transformers have 12,000 capacity each and a third has a capacity of 19,200 kilowatts. Recently two 110-11 kv. three-phase transformers have been set up at the South Meadow Substation. One of these transformers has been used to connect the line D-4 to the 11 kv. bus of the Hartford Electric Light Company. Line D-4 now is being operated at 110 kv. and is, of course, no longer connected to the 66 kv. bus at South Meadow.

Q In giving the capacity of the three transformers as 12,000 for two and 19,200 for the other, is that capacity properly expressed in kilowatts or in k.v.a.? *A* I am sorry. The capacity of a transformer should always be expressed in k.v.a.

Q And did you mean to express it in k.v.a.? *A* I did.

Trial Examiner: Will the witness state one thing. For the benefit of those of us who are not necessarily familiar with engineering design and diagram, will you state what symbol has been used here on this diagram to indicate the transformers?

Mr. Wahrenbrock: I think that is very appropriate, Mr. [*1451*] Examiner.

The Witness: The symbol of a transformer is usually, on a one line diagram, a sort of a wiggly line, a series of short lines going

at angles to one another. The best expression I can use is a wiggly line.

Trial Examiner: Perhaps a zig zag line will best describe it.

The Witness: Yes, a zig zag line, and you will notice on the Exhibit No. 60 that at the South Meadow Substation there is an 11 kv. bus indicated, and then there is shown three lines extending from that vertical line, which is the bus, a short distance, and then these three zig zag lines are shown, which represent in each case one side of the transformer, and then the other three zig zag lines close to it represent the other side of the transformer.

Trial Examiner: I think with that explanation it is much easier to follow the testimony of the witness.

By Mr. Wahrenbrock: *Q* Did the South Meadow Substation at times deliver energy which went to The Turners Falls Power and Electric Company? *A* Yes.

Mr. Branch: I move to strike that out on the same ground.

Trial Examiner: The motion is overruled.

By Mr. Wahrenbrock: [*1452*] *Q* Did the South Meadow Substation at times receive energy which came from The Turners Falls Power and Electric Company?

Mr. Branch: Objection on the same ground.

Trial Examiner: The objection is overruled. *A* Yes.

By Mr. Wahrenbrock: *Q* What lines were used to connect the South Meadow Substation, with Turners Falls Power and Electric Company facilities?

Mr. Branch: May it be stipulated I have an objection to this line of inquiry without objecting to each question?

Trial Examiner: It is so understood. You may proceed.

A Until recently, South Meadow Substation was connected to The Turners Falls Power and Electric Company by means of two 66 kv. Hartford-Agawam lines, and the auto-transformers at South Meadow Substation. The Connecticut Power Company owned the lines to the Massachusetts border and The Turners Falls Power and Electric Company the section in Massachusetts. Since

the 110-11 kv. transformers were put in service, one of the lines is operating at 110 kv. and the energy received from that line is delivered to the 11 kv. bus of The Hartford Electric Light Company.

By Mr. Wahrenbrock: *Q* Mr. Miller, in order that we may understand this [*1453*] engineering phraseology, will you explain what kv. what the expression kv. means? *A* "kv." means thousands of volts.

Q What does the expression which you used in referring to the transformers, k.v.a. mean? *A* It means kilo-volt-amperes, or thousands of volt amperes.

Q What lines were used in the delivery of electric energy to Middletown.

Trial Examiner: Before we pass to that point, Mr. Wahrenbrock, I would like to ask the witness what symbol indicates the presence of the auto-transformers referred to.

The Witness: On Exhibit 60 the auto-transformers are indicated by a single zig-zag line and the connections to that zig-zag line being made at different points.

Trial Examiner: I just wanted to verify my own idea in that matter. Thank you.

By Mr. Wahrenbrock: *Q* While we are getting this matter of phraseology and symbols established, I would like to ask the witness if he will refer to Exhibit 60 for Identification, to the Bristol Substation, and point out and describe the symbol for a three-winding power transformer. *A* Well, the Bristol Substation is shown there at the right center of the Exhibit 60, and in that substation there is shown from the bus marked "66 kv." two short lines extending [*1454*] to two zig-zag lines which represent a winding of each of the two transformers. Then there is shown just above those zig-zag lines another pair of zig-zag lines extending to the 4.6 kv. bus. That represents the second winding on each of the transformers. Just above the second zig-zag lines there is a pair of zig-zag lines with a line extending to the 13.8

kv. bus. Those third zig-zag lines represent the third winding of each of the transformers.

Q I now repeat the question which I previously asked; what lines were used in the delivery of electric energy to Middletown? *A* The C. P. 1 and C. P. 2 lines were tapped at a place known as Point No. 12. A line about 7.53 miles long extends to the West Side Substation in Middletown. Prior to the completion of the West Side Substation the Middletown tap extended to the Cromwell Substation in Middletown.

Q How were The Connecticut Power Company's requirements for Portland and The Connecticut Light and Power Company's requirements for its East Hampton District supplied during the period covered by your study, prior to July 1, 1939? *A* Two 13.8 kv. lines extended from the West Side Substation across the river to the Wolcott Lane Substation. From there a wood pole line extended to a point known as Pole No. 110 in the town of Portland, where, up until July, 1939, The Connecticut Light and Power Company received electric [*1455*] energy for its East Hampton Division. Prior to the completion of the West Side Substation Portland was supplied from the Water Street Substation in Middletown.

Q Until July, 1939, was the delivery by The Connecticut Power Company to The Connecticut Light and Power Company at Pole 110 the exclusive source of supply of the energy requirements of the East Hampton District of The Connecticut Light and Power Company?

Mr. Branch: Excuse me. May I have that read?

Trial Examiner: The reporter will read back the last question, for the benefit of respondent's counsel.

(Question read by reporter.)

A No, until September, 1938 the supply for this district was partly from the Leesville Hydro-electric Plant. This plant was destroyed in the storm of September, 1938, after which the Portland supply was the sole supply, or I really should say practically the sole supply until some time prior to July 1, 1939. An indus-

trial customer annually supplied a small amount of energy to the East Hampton District of the Connecticut Light and Power Company.

By Mr. Wahrenbrock: *Q* What facilities were used to deliver electric energy to Bristol, to the Bristol District of the Connecticut Light and Power Company? [*1456*] *A* The C. P. 1 line and C. P. 2 line were tapped at a point known as Tower 474. Two lines about 1.83 miles long extended to the Bristol Substation of The Connecticut Light and Power Company.

Q What facilities were used to deliver electric energy to The Torrington Electric Light Company? *A* At a point about 2.24 miles from Torrington, the C. P. 1 line from the east and the C. P. 1 line from the west, instead of joining, were connected to lines extending into Torrington to a substation of The Connecticut Power Company on the property of The Torrington Electric Light Company. At the Torrington Substation the voltage was stepped down to 2.3 kv. for the delivery of energy to The Torrington Electric Light Company.

Q Did The Torrington Electric Light Company sell that energy which it received at wholesale for resale? I haven't expressed my question well. Did it sell at wholesale for resale any of that electric energy which it received? *A* Yes, to The Connecticut Light and Power Company, and the latter received the energy at 2.3 kv. transmitted it to its nearby substation, where the voltage was stepped up to 27.6 kv. at which voltage the energy was transmitted to Winsted, a distance of about ten or eleven miles.

Q I will put this question to you, please. In your study, [*1457*] did you ascertain that there were any periods of time in which only electric energy from Massachusetts was supplying requirements of the load supplied by The Connecticut Power Company's 66 kv. line from Hartford to Falls Village?

Mr. Branch: May I have that read? I am willing to stipulate that is a question by Mr. Wahrenbrock, but I would like to have it read.

Trial Examiner: The question will be read for the benefit of respondent's counsel.

(Question read by the reporter.)

Mr. Branch: I object to that. I mean that I think it at best may be a conclusion of the witness, based upon something or other. It has not appeared at all what he bases it on, or what his reasoning is, or whether he has any proper basis for forming a conclusion. I don't think that a proceeding which goes ahead and asks for that kind of matter which obviously must be a matter of conclusion based upon a good many deductions, and so forth, can be put in as evidence in this way, and I object strenuously to doing it in this way. It does not appear that he has any basis for any such conclusion.

Trial Examiner: Does the Commission's counsel wish to be heard?

Mr. Wahrenbrock: We have shown that the witness has studied the facilities and shown by his answer to this question what his [*1458*] study has shown and propose to show by subsequent questions the details by which the study that he has made demonstrates the conclusion.

Trial Examiner: This is proposed to be made as a statement of fact and not as a conclusion. The witness will be subject to cross examination as to the basis of his determination. The objection is overruled and the witness may answer.

Mr. Branch: I bow to your ruling, but I do suggest it is very unusual procedure for a witness in a matter like this, without indicating what the basis is, the factual basis or the theoretical basis for such a conclusion, to be allowed to state it, because I should say that neither the Examiner or anyone else is yet in a position to see how there is any basis for any such conclusion as this.

Trial Examiner: It may be that in order to be understood, he will have to answer some further questions, either on direct or cross-examination. The witness may proceed.

Mr. Branch: My exception is noted?

Trial Examiner: The exception will be noted.

A I did.

By Mr. Wahrenbrock: *Q* Will you explain? *A* I have stated that the electric energy was supplied to the C. P. 1 and the C. P. 2 lines at the South Meadow Substation from the Falls Village generating plant, and—I am sorry [*1459*] I misspoke myself. I have stated that electric energy was supplied to C. P. 1 and C. P. 2 lines at South Meadow Substation and at the Falls Village generating plant. I found numerous periods of time during which the generation at Falls Village was zero and South Meadow Substation was receiving all its energy from Massachusetts and none from The Hartford Electric Light Company. At the same time no energy was being received from the Central Hudson Gas & Electric Corporation.

By Mr. Wahrenbrock: *Q* Can you cite a particular instance when such a condition existed and explain it? *A* Yes. Such a condition existed on Sunday, January 15th, 1939, during the first nine hours of the day. I have prepared a table showing the energy operations along the C. P. 1 and C. P. 2 lines for those hours. I have also prepared a graphic representation which illustrates the flow of electric energy on the C. P. 1 and C. P. 2 lines under these conditions, which I have called "Flow Diagram A".

Mr. Branch: May it be stipulated that motion goes to this entire line, and I move to strike out that answer on the same ground that I objected?

Trial Examiner: Your motion may be noted, and it is understood.

By Mr. Wahrenbrock: [*1460*] *Q* Will you produce the tables and the diagram to which you have referred?

Trial Examiner: At the present time we are faced with mechanical difficulties and it might be a good time to take a ten minute recess, and we will so be in recess.

(After a short recess, the hearing was resumed.)

[*1461*] Trial Examiner: The hearing will be in order.

Mr. Wahrenbrock: I ask that the table referred to by the witness be marked for identification—

Mr. Branch: May I see it?

Mr. Wahrenbrock: Yes, sir. (Hands document to counsel.) I ask that it be marked as Exhibit No. 61.

Trial Examiner: There seems to be a shortage of copies.

Mr. Wahrenbrock: There is no shortage of copies. I am going to hand two copies to respondent's counsel. I will hand one copy to the Examiner, and ask that the original be marked for identification as Exhibit No. 61.

Trial Examiner: The document will be marked Exhibit No 61 for Identification.

(The document referred to was marked as Exhibit No. 61 for Identification.)

Trial Examiner: Does the original have any marking on the outside?

Mr. Wahrenbrock: No, sir. I hand two copies to respondent's counsel, one to the examiner, and one to the reporter, of the diagrams referred to, and ask that it be marked Exhibit No. 62 for Identification.

Trial Examiner: Mr. Wahrenbrock, for later handling, isn't there some way that we can get a name to put on the outside of this other than the exhibit number, which would be descriptive of its contents?

[*1462*] Mr. Wahrenbrock: I thought it would be best to rely upon the identification as an exhibit, and avoid the confusion.

Trial Examiner: If it is so arranged, it may be advisable to let it stand as it is for the present, at least. I was thinking of later convenience.

Mr. Wahrenbrock: There is a designation on the first sheet of the table, and there is a designation on each sheet of the diagram.

Trial Examiner: The diagram, or the group of diagrams, which are designated from A to K with, I believe, J omitted—

Mr. Wahrenbrock: That is right.

Trial Examiner: Will be marked as Exhibit No. 62 for Identification.

(The document referred to was marked as Exhibit No. 62 for Identification.)

Trial Examiner: Counsel may proceed.

By Mr. Wahrenbrock: *Q* Referring to Exhibit No. 61 for Identification, and to the sheet of that exhibit which is headed, "Sunday, January 15, 1939",—

Trial Examiner: These sheets are not numbered, are they?

Mr. Wahrenbrock: No, sir. They are headed with the designation of the dates, and the dates are in chronological order.

By Mr. Wahrenbrock: [*1463*] *Q* Will you state the sources of information on which the figures on that sheet are based? *A* The figures in the first section of this table, and in the line showing the delivery to Bristol, were obtained from photostatic copies of the log sheets of the Connecticut Valley Exchange. The figures with respect to Falls Village generation and delivery to Central Hudson Gas & Electric Corporation were obtained from photostats of the log sheets of the Connecticut Valley Power Exchange and of The Housatonic division of the Connecticut Power Company. The figures with respect to The Housatonic division load were obtained from the photostats of the log sheets of The Housatonic division. The figures with respect to deliveries at Torrington, deliveries to The Torrington Electric Light Company, were obtained for this day from photostats from the R. A. meter sheets for Torrington. The figures in the third section of the table were obtained from The Connecticut Light and Power Company.

Q Before going further, will you please state whether the corresponding figures on other sheets in Exhibit 61 for Identification were obtained from the same sources except for the figures with respect to deliveries to The Torrington Electric Light Company? [*1464*] *A* These figures on all sheets for the days included in these tables were taken from the sources as indicated, except that the deliveries to The Torrington Electric Light Company were in some cases obtained from the photostats of the

printometer records at Torrington. The printometer records, I believe, apply to 1940 and 1941.

Q What is the source of the figures from which you have obtained the figures in this table? *A* Could I have that question again, please?

Q You have said that these figures were obtained from certain log sheets, and so forth. What do they represent on the log sheets? *A* These figures represent on the log sheets either direct recordings from the meter readings, or calculations made from such meter readings and recorded on the log sheets.

Q Will you explain. *A* There were watt hour meters at South Meadow which showed the cumulative amount of the flow of energy over the Hartford-Agawam line from Massachusetts to South Meadow substation. These meters were read hourly by an employee who recorded the readings on the station log sheet. The flow during any hour over a line is the difference between meter readings at the end of the hour and the meter reading at the end of the preceding hour. The 22,000 kilowatt hours shown as received from Massachusetts during the first hour is the sum [*1465*] of the flow over the two lines as obtained from the meter readings. The meters are ratcheted so that they do not register when the energy flow is in reverse direction, similar meters being provided for the flow of energy from South Meadow to Massachusetts.

Q When you referred to the 22,000 kilowatt hours shown as received from Massachusetts during the first hour, were you referring to the table for Sunday, January 15, 1939 in Exhibit 61 for Identification? *A* Yes. I was referring to that. That was the page at which I was turned.

Q How does a ratcheted meter differ from an ordinary watt-hour meter? *A* If an ordinary watt-hour meter were used on the Hartford-Agawan line at South Meadow substation, the indication on the meter of flow from Massachusetts to South Meadow during some hours would be reduced by reason of the flow of energy from South Meadow to Massachusetts during other hours.

In order to obtain indications of the total flow of energy in each direction, two meters are placed on each line, so arranged by means of mechanical ratchets that one will integrate the flow in one direction, but whose register will not operate when the flow is reversed. The other meter will integrate the energy flow in the direction opposite to that, causing the first to register, and will not register while the first [*1466*] is registering. In the case of the Hartford-Agawan line, one meter integrates the flow from Massachusetts to Connecticut, and the other meter integrates the flow from Connecticut to Massachusetts.

Trial Examiner: Did I understand the witness to say "indicate" or "integrate"?

The Witness: I have used both. I believe I was referring—

Trial Examiner: The last three times you used the word is what I had in mind.

The Witness: Integrate—i-n-t-e-g-r-a-t-e-s.

By Mr. Wahrenbrock: *Q* Were there any other ratcheted meters at the South Meadow substation? *A* A ratchet meter for each direction of flow is provided for each of the three lines connecting The Hartford Electric Light Company to South Meadow substation. Separate ratchet meters for each direction of flow were provided to show the flow of energy between the South Meadow substation and the CP-1 and CP-2 lines. All of these meters were read hourly, and the readings recorded on a station log sheet by an employee.

Q Will you please describe the metering at the other points as shown in the table? *A* The generation at Falls Village was obtained by totaling the information obtained from the hourly readings of the [*1467*] separate meters in each of the three generator circuits at Falls Village. The Housatonic division load was obtained from the hourly readings of the single meter provided for the two circuits supplying the Housatonic division load. The delivery to Central Hudson Gas & Electric Corporation was obtained from the hourly readings of the ratcheted meter provided for this circuit. These readings are recorded on the Falls Village

station log sheets hourly by an employee. The delivery to The Torrington Electric Light Company for this day was obtained from the R.A. demand meter charts as the watt-hour meter at Torrington is not read hourly.

Q Will you explain that? *A* Prior to the year 1938, there was no hourly demand reading available at Torrington. During the years 1938 and 1939, the demand of The Torrington Electric Light Company was recorded by an R.A. demand meter. This meter drew a curve proportional to the amount of energy received during each 15-minute period, the curve starting from zero at the beginning of each 15-minute period. From photostatic copies furnished by The Connecticut Power Company of the charts drawn by this meter, the data shown in the tables were computed. During the year 1940 and during the current year 1941, the demand at Torrington was obtained from a printometer. This meter prints each 15 minutes a number proportional to the kilowatt hours received during those 15 minutes. From the photo- [*1468*] static copies of the record of this printometer furnished by the Connecticut Power Company, the data for Torrington for the days and the years 1940 and 1941, were obtained.

Q With that explanation, will you please continue with your description of the metering at the points shown on the table? *A* The delivery to The Connecticut Light and Power Company at Bristol was obtained from the hourly readings of the single meter provided for the two circuits at Bristol. These hourly readings were recorded in a log sheet at the Bristol substation, and were also telephoned to the Connecticut Valley Power Exchange at Hartford for insertion in the log sheets of the Connecticut Valley Power Exchange. The receipt by The Connecticut Light and Power Company of the electric energy from The Torrington Electric Light Company was obtained from the hourly readings on the ratcheted meters at Torrington, and recorded on station log sheets of The Torrington Company. That data was furnished to the Commission by The Connecticut Light and Power Company in tabulated form. The generation at Robertsville is shown for the

hourly readings of the watt-hour meter of the output of this plant, recorded on log sheets by the operator. This data, too, was supplied to the Commission in tabular form by the Connecticut Light and Power Company.

Q With that description of the bases of information [*1469*] on which the table is based, will you now describe the table? *A* Referring to the table for Sunday, January 15, 1939, you will note that it is divided into four sections. The first section tabulates for selected hours The Connecticut Power Company's energy operation at its 66 k. v. substation at South Meadow. The amounts of energy received at South Meadow substation from Massachusetts over the Hartford-Agawam line are listed on the first line of the table. On the second line of the table, the amounts of energy received by The Connecticut Power Company from The Hartford Electric Light Company at the substation—I should say at the South Meadow substation, are listed. On the third line of the table, the amounts of energy which were delivered by The Connecticut Power Company to The Hartford Electric Light Company at South Meadow are listed. On the fourth line in the table the amounts of energy delivered to the CP-1 and CP-2 lines from the South Meadow substation are listed. For all hours shown on all tables included in this exhibit, no energy was delivered to Massachusetts over the Hartford-Agawam line, and no energy was received at South Meadow from CP-1 and CP-2 lines. The second section of the table tabulates The Connecticut Power Company's operations along the CP-1 and CP-2 lines. On the first line of the table are listed the amounts of [*1470*] energy generated at Falls Village. On the second line of the table are listed the loads in the Housatonic division. On the third line of the table are listed the amounts of energy delivered to Central Hudson Gas & Electric Corporation.

Trial Examiner: Just a moment. Do I understand that by "all hours" you are referring to the entire table, or simply to the nine hours that were referred to a while ago in the question?

The Witness: I don't know how I expressed myself, Mr. Examiner.

Trial Examiner: Read the witness's answer to that question.

(Whereupon the last answer as above recorded, was read by the reporter.)

[*1471*] Trial Examiner: I think the point is clear.

The Witness: Can you tell me where I left off?

(The witness's last remarks were read by the reporter.)

A (Continuing) On the fourth line of the table are listed the deliveries by The Connecticut Power Company to The Torrington Electric Light Company. On the fifth line are listed the deliveries by The Connecticut Power Company to the Connecticut Light and Power Company at Bristol. For all hours shown on all tables in this exhibit no energy was received from the Central Hudson Gas & Electric Corporation.

Mr. Wahrenbrock: Will you let me interrupt a moment? Is that statement clear at that point?

Trial Examiner: I think it is.

Mr. Wahrenbrock: Thank you.

By Mr. Wahrenbrock: *Q* Will you continue? *A* The third section of this table tabulates the energy operations of The Connecticut Light and Power Company in its Winsted District. On the first line of the table are listed the amounts of energy received by the Winsted District from The Torrington Electric Light Company. On the second line of the table are listed the amounts of energy generated at Robertsville; for all hours, shown on all tables in this exhibit, no energy was delivered from Winsted to Torrington. The fourth section of [*1472*] the table shows the applicable flow diagram.

Q And by "Applicable Flow Diagram" you mean it shows the flow diagram in Exhibit 62 for Identification, which is applicable to the hour under which the latter appears? *A* Yes.

Q Will you describe now Flow Diagram A of Exhibit 62 for Identification. *A* Flow Diagram A illustrates the flow condition when energy transmitted from Massachusetts and received at South

Meadow Substation is delivered to the C. P. 1 and C. P. 2 lines, and possibly to the Hartford Electric Light Company during the hours when generation at Falls Village is zero and no energy is received from the Central Hudson Gas & Electric Corporation. On this diagram the Massachusetts energy is shown in red. The blue color is used in this diagram to indicate Connecticut generating plants and energy generated in Connecticut. The arrows indicate the direction of flow. It will be noted that from Massachusetts, the stream of Massachusetts energy is shown reaching South Meadow Substation and then passing into The Hartford Electric Light Company and also into the C. P. 1 and C. P. 2 lines. Under this condition the Massachusetts energy was transmitted to Middletown, and Portland from the Middletown tap on the C. P. lines prior—

[*1473*] Mr. Branch: I think he was just explaining, I think this is not responsive, where he goes further.

Trial Examiner: You mean it is not responsive to the question of counsel?

Mr. Branch: Yes.

Trial Examiner: All right. The witness will restrict himself to answers to the questions.

Mr. Wahrenbrock: Well, may I ask the witness to explain what this diagram represents, with reference to the flow of Massachusetts energy to Middletown and Portland?

Mr. Branch: Well, I object to that on the ground that no proper basis for any such conclusion as the diagram gives in that respect has been laid.

Trial Examiner: I think a rather considerable amount of evidence pointing in that direction, based upon studies, has been presented. The source of the study has been shown and the evidence will be admitted and objection will be noted to the overruling of objection of counsel.

Mr. Branch: May I have a general objection to this line of questions, if they are to continue, without having to interrupt after each question?

Trial Examiner: You may.

The Witness: May I have the question read?

(Question read by the reporter.)

A This diagram indicates that under this condition [*1474*] Massachusetts energy was transmitted to Middletown and Portland from the Middletown tap on the C. P. lines and to the C. L. & P. Company at Portland, prior to July 1, 1939.

By Mr. Wahrenbrock: *Q* Before you continue with your explanation of the diagram, will you explain the part of the diagram which relates to Hartford? What does the blue circle represent? *A* The Hartford Electric Light Company's plant is shown by a blue circle, but the diagram shows that no energy from that plant is under this condition delivered to the C. P. 1 and C. P. 2 lines.

Q Will you explain what the diagram represents, with reference to the further flow of Massachusetts energy to the C. P. 1 and C. P. 2 lines to the west? *A* The diagram shows Massachusetts energy is transmitted to Bristol, to The Connecticut Light and Power Company; Massachusetts energy is transmitted to the Thomaston Division of The Connecticut Light and Power Company and to Torrington. At Torrington part of this energy is used in supplying The Torrington Electric Light Company's own load and part is delivered by The Torrington Electric Light Company to The Connecticut Light and Power Company. The diagram shows The Connecticut Light and Power Company transmits this energy to Winsted for consumption in the service area of Winsted District.

[*1475*] *Q* When you say "the diagram shows", do you mean the diagram is designed to illustrate that type of flow? *A* Exactly. The Robertsville plant is shown as connected to the Winsted District by a blue circle and a blue stream of energy.

Q The blue representing—? *A* Connecticut energy and a Connecticut plant. The broken or dotted arrow alongside this blue stream of energy from Robertsville, indicates that at times under this condition there is no energy delivered from the Robertsville plant.

Q What does the arrow with the broken stem at the right-hand side of the page beside the red line which leads to The Hartford Electric Light Company generating plant indicate? *A* That arrow indicates that under the flow conditions illustrated by flow diagram A, there may be a flow of energy to The Hartford Electric Light Company from the South Meadow substation of The Connecticut Power Company. It is shown in that form as indicated in the legend to indicate that the flow actually may be zero under the conditions illustrated by this diagram.

Q With that explanation, will you continue your explanation of what the diagram is intended to illustrate? *A* I wish to complete my statement about Robertsville. When I stated that at times there is no energy delivered from the Robertsville plant, I wish to add that this is true when the [*1476*] Robertsville plant is not generating. Massachusetts energy is transmitted to Falls Village and to the Housatonic Division. The arrow indicating the flow of energy to Central Hudson Gas & Electric Corporation is dotted because the flow to the Central Hudson Gas & Electric Corporation under this condition may be zero.

Q Will you now explain for some hour shown on the table, which is Exhibit 61 for Identification, how you establish the flow diagram that is applicable to the conditions prevailing during that hour? *A* Referring to the first hour of the day I have previously referred to, January 15th, 1939, I will go through the table step by step, and outline the reasons why Flow Diagram A depicts the energy flow for that hour. I have previously stated that at the South Meadow substation The Connecticut Power Company can receive or deliver electric energy through the connection with The Hartford Electric Light Company, the Hartford-Agawam lines and the C. P. 1 and C. P. 2 lines. During this hour The Connecticut Power Company received at South Meadow substation 22,000 kilowatt hours from Massachusetts. Flow Diagram A which shows Massachusetts energy flowing to South Meadow, corresponds to that condition. No energy was received from The Hartford Electric Light Company during that hour, and 14,000 kilo-

watts were delivered to The Hartford Electric Light Company. Flow [*1477*] Diagram A shows the Massachusetts energy flowing to the Hartford Electric Light Company according to the table. During this hour, 8,000 kilowatt hours were delivered by South Meadow substation to the C. P. 1 and C. P. 2 lines. Since the only energy supplied to the South Meadow substation during this hour was delivered to Massachusetts, the 8,000 kilowatt hours delivered to the C. P. 1 and C. P. 2 lines were Massachusetts energy. Flow Diagram A, which shows Massachusetts energy flowing to the C. P. 1 and C. P. 2 lines, corresponds to this condition. The table further shows that the generation at Falls Village was zero during this hour. Since Falls Village and the South Meadow are the only sources of energy on the C. P. 1 and C. P. 2 lines, and at Falls Village generation was zero, all energy on the C. P. 1 and C. P. 2 lines must have been transmitted from South Meadow. This energy, as I have just shown, was all transmitted from Massachusetts. Flow Diagram A, which shows Massachusetts energy flowing to all points along the C. P. 1 and C. P. 2 lines, therefore, illustrates that condition.

Q Will you discuss each delivery point along the C. P. 1 and C. P. 2 lines, with respect to the flow of energy as shown in the table and illustrated by the diagram? *A* The diagram illustrates Massachusetts energy flowing to the Middletown Division. The table does not make any statement [*1478*] in regard to the amount of energy flowing to Middletown during each hour. Such information was not easily available and is not needed to establish the fact of the flow of energy to Middletown. I have previously shown that the entire supply of electric energy from the Middletown Division was received from the C. P. 1 and C. P. 2 lines. Therefore, during this hour, the Middletown Division received Massachusetts energy which was the only energy which was delivered to the C. P. 1 and C. P. 2 lines. During the hours of the day the East Hampton District—

Q (Interrupting) Will you suspend until some of the racket subsides?

Trial Examiner: The witness may proceed with his answer.

The Witness: Will you read the last sentence?

(The record is read.)

A During the hours of this day the East Hampton District had no other source of supply, excluding the industrial customer which delivered a small amount of electric energy to The Connecticut Light and Power Company during the year. So that it is evident that Massachusetts energy was the only energy received at Middletown Division during the first hour and must have been transmitted to the Connecticut Light and Power Company at Portland. The flow diagram which shows Massachusetts energy flowing [*1479*] to Portland and The Connecticut Light and Power Company at Portland, therefore, illustrates that condition properly.

Q And you are still referring to Flow Diagram A? *A* I am referring to Flow Diagram A. The table shows that during this hour, 2,000 kilowatts of electric energy was delivered to Bristol, that is, to the Connecticut Light and Power Company at Bristol. I have previously shown that the Bristol energy, that is, the energy delivered to Bristol, is supplied from the C. P. 1 and C. P. 2 lines; since the only energy delivered to the C. P. lines during this hour was Massachusetts energy, it is evident that Massachusetts energy was delivered to Bristol. The Flow Diagram shows the flow of Massachusetts energy to Bristol. The table does not make any reference to the hourly delivery of energy to Thomaston. Such data was not easily available and is not necessary to establish the fact of the flow of energy to Thomaston. I have previously shown that the entire supply of electric energy in the Thomaston Division was received from the C. P. 1 and C. P. 2 lines. The only energy delivered to the C. P. 1 and C. P. 2 lines was Massachusetts energy, therefore it is evident that Massachusetts energy was delivered to Thomaston. The Flow Diagram A shows the flow of Massachusetts energy to Thomaston. [*1480*] The table shows that during the first hour of the day, that is, January 15th, 1939, 1,160 kilowatt hours were delivered to The Torrington Electric Light Company. I have previously shown that Torrington is

supplied from the C. P. 1 line. Since only Massachusetts energy was delivered to the C. P. 1 line, it is evident that Massachusetts energy was delivered to Torrington. Flow Diagram A shows the flow of Massachusetts energy to Torrington. The table shows that 800 kilowatt hours were received by the Winsted District from The Torrington Electric Light Company during the first hour. Since, as I have shown, Torrington was receiving Massachusetts energy, it is evident that Winsted also received Massachusetts energy. Since the table shows the generation at Robertsville was zero, it is evident that all the energy used by the Winsted District during the first hour was Massachusetts energy. Flow Diagram A shows the flow of Massachusetts energy to Winsted. Since, as the table shows, the Falls Village plant was not generating, all the energy to the Housatonic Division load amounting to 700 kilowatt hours during the first hour was received from the C. P. 1 and C. P. 2 lines. Since the supply to these lines was Massachusetts energy, [*1481*] it is evident that Massachusetts energy was delivered to the Housatonic Division. Flow Diagram A shows the flow of Massachusetts energy to the Housatonic Division. The table shows that there was no delivery to the Central Hudson Gas & Electric Corporation during the first hour. The diagram indicates by the dotted arrow that the flow to the Central Hudson Gas & Electric Corporation might be zero during the hour. I have gone through the whole Flow Diagram and explained the conditions for the first hour on the table, and showed that the data in the table indicates that the flow was as illustrated by Flow Diagram A.

Q Are there any apparent inaccuracies in the records of meter readings at any point? *A* There are certain apparent inaccuracies which can be explained as being due to the large meter constants. Each of the meters at the South Meadow substation showing the flow over the lines between the South Meadow substation and The Hartford Electric Light Company, the Hartford-Agawam lines and the C. P. 1 and C. P. 2 lines, has a constant of 1,000. That is to say, the smallest unit of measurement is so large as to measure

only roughly small quantities. These meters are read to the nearest division of the dial. In the reading for the first nine hours of January 15th, 1939, there are a total [*1482*] of seven meter readings required to show the figures for the operation of the South Meadow substation. Each of these meters has a constant of 1,000, so that apparent discrepancies between incoming and outgoing energy at the substation is to be expected.

Q Will you explain a little more fully what you mean by a "meter constant"? *A* I mean the amount of energy shown on the meter dial as its smallest unit of measurement.

Q These apparent inaccuracies, to which you have referred, are not due to errors or defects in the meters? *A* No. They are due to the large meter constants. All physical measurements, whether of electric energy or length or volume or area or any other quantity, are subject to the limitations imposed by the smallest unit reading of the instrument used.

Q As a result of the large meter constants, will a meter reading indicate a flow of energy during an hour when, in actual fact, no flow existed? *A* No.

Q Will you explain? *A* The meter may be capable of being read only in such a manner that the reading will indicate a greater or lesser flow during an hour than actually occurred during that hour, but will not show a flow when none took place.

[*1483*] *Q* What is the effect of the large meter constants to which you have referred, on the total of readings, over several consecutive hours? *A* The relative effect becomes less. An individual reading as recorded will not be more than one half of a dial unit higher or lower than the actual amount.

Q In this case do you mean that it wouldn't be more than 500 kilowatt hours, more or less than the actual amount? *A* That is correct. The recorded energy flow over a period of consecutive hours, as obtained from meter readings can differ from the actual flow by not more than one dial unit. Therefore, for several consecutive hours the relative error becomes relatively smaller.

Q Can you therefore state that whenever you have shown in

this table a flow of energy over a line, energy must have flowed over that line during the hour? *A* Yes.

Q Have you covered all of the apparent inaccuracies in the reported meter readings? *A* No.

Q Will you explain the others? *A* You will note that during the first eight hours of January 15th, 1939, the Robertsville plant was not operating. Therefore we know no energy was received from Robertsville, but while there are no figures shown for the receipt of energy [*1484*] from The Torrington Electric Light Company during the second, fourth, fifth and seventh hours, it is evident that the energy used in the Winsted District during those hours must have been supplied from Torrington.

Q Can you explain that? *A* The fact that there appeared to be no receipt of energy for Winsted from either source during those hours can be explained as being due to the relatively large meter constant at Torrington. The Torrington meter at that date had a meter constant of 1,600 and was read to the nearest half division, so that effectively its meter constant was 800, and since the delivery to Winsted is much less than 800 during many hours, the meter readings as recorded at the end of two or more consecutive hours may be the same although in fact energy was continuously delivered to Winsted. I therefore had arrows drawn between figures for delivery to Winsted, to indicate that part of the amount recorded for a particular hour probably actually flowed during the period before and after the hour in which the amount is shown.

Q When you say you have had arrows drawn, are you referring to the tables, and all of the tables in Exhibit 61 for Identification? *A* I am.

Q That is the line which follows the item "Received from The Torrington Electric Light Company"? [*1485*] *A* That is right.

Q Will you continue with your explanation? *A* Specifically the 800 kilowatt hours shown during the first hour undoubtedly includes some energy delivered during the second hour. The 800 kilowatt shown at the third hour probably includes some energy which was delivered during the second, fourth and possibly fifth

hour. The 800 kilowatt hour which is shown at the sixth hour possibly includes some energy delivered during the fifth, seventh and possibly the fourth hour. The fact that 800 kilowatt hours is recorded in the log sheet during a particular hour merely establishes that the points on the meter dial advanced enough during that hour, because of a flow of energy during that hour, to cause the operator to read it as registering nearer the next effective unit, at the end of the hour.

[*1486*] *Q* What can you say as to the accuracy with which meter readings are taken and the records made on log sheets? *A* Ordinarily, the meter readings are taken carefully and scrupulously recorded on the log sheets. The company depends on meter readings and log sheets in its transactions with other companies, for its information on generation receipts and deliveries of energy, for its load data, for information as to its future needs, and for many other purposes. The taking of meter readings and the preparation of log sheets involve expenses that would not be justified if the data were not reliable. I would say that meter readings and log sheets can be relied on in general for accuracy.

Q What account have you taken of losses on the lines and in the substation? *A* The losses on the lines and in the substations need not be considered with respect to flow diagram A, as they could not change the type of flow during the hours when flow diagram A applies.

Q Can you identify any other instances during which Falls Village generation was zero and energy from Massachusetts only was supplying loads served by CP-1 and CP-2 lines from Hartford to Falls Village, during the period covered by your study?

Mr. Branch: May I have that question read? I didn't follow it.

[*1487*] Trial Examiner: The question will be read for the benefit of counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: In addition to the table for January 15, 1939, I have prepared tables for twenty other days. On eight of these

days, the energy flow conformed to Flow Diagram A, for two or more consecutive hours. The days are as follows: May 12, 1937, June 1, 1937, May 30, 1938, November 26, 1938, January 15,—

Mr. Branch: Just a minute, while I take those down. Can you give the days of the week?

The Witness: I haven't got them handy. They are shown on each one of the tables, so that when you turn to the tables you know the day of the week immediately.

Mr. Branch: The last date I have is November 26, 1938.

The Witness: January 15, 1939, May 22, 1939, May 29, 1939, June 1, 1939.

Trial Examiner: The witness may well keep in mind the fact that attorneys as a rule are not stenographers, and also it is rather difficult for them to take anything like that down when it is said rapidly.

Mr. Branch: I think I got it. Your statement as to me is entirely correct.

By Mr. Wahrenbrock: [*1488*] *Q* Mr. Miller, were there any periods of time other than those represented by Flow Diagram A, in which only Massachusetts energy was supplying requirements of the loads supplied by the CP-1 and CP-2 lines from Hartford to Falls Village? *A* Yes.

Q Have you prepared a diagram illustrating such flow? *A* Yes. Flow Diagram C and Flow Diagram I. Flow Diagram C and Flow Diagram I are contained in the exhibit of which Flow Diagram A is a part.

Q Will you explain the type of flow illustrated by Flow Diagram C? *A* Flow Diagram C illustrates the flow condition when energy transmitted from Massachusetts and received at South Meadow substation is transmitted to CP-1 and CP-2 lines, and none is received at South Meadow from the Hartford Electric Light Company. And during the same hour, the generation of Falls Village was less than the combined deliveries to the Housatonic division and the Central Hudson Gas and Electric Corporation. This diagram is the same as Flow Diagram A from Massa-

chusetts, that is, from the right-hand side of the diagram leftwards, up to but not including Falls Village. As indicated in Flow Diagram A, Massachusetts energy is transmitted to Middletown and Portland, to Bristol, to Tomaston, and Torrington. From Torrington, Massachusetts energy is [*1489*] transmitted by The Connecticut Light and Power Company to Winsted for its service area there. It will be noted that under this condition the Housatonic division is entirely supplied with energy generated in the Falls Village plant, and that Central Hudson Gas & Electric Corporation—

Mr. Branch: Excuse me. Are you speaking of C or I, or both?

The Witness: C.

A (Continuing) And that Central Hudson Gas & Electric Corporation receives both energy generated at Falls Village and Massachusetts energy from South Meadow.

By Mr. Wahrenbrock: *Q* Will you now illustrate by reference to a particular hour of some day, the energy conditions which are illustrated by Flow Diagram C? *A* Referring to the table for Sunday, May 7, 1939—

Q How many pages following the last one that you referred to is that? *A* I believe it is the second or third sheet.

Mr. Branch: Are these all Sundays?

Mr. Wahrenbrock: The day of the week appears at the top of the page.

Mr. Branch: Yes. All that I have seen were.

Mr. Wahrenbrock: I will be glad to explain that point a little later. I can't get everything in at once. Are you ready that the witness should continue?

[*1490*] Mr. Branch: Yes.

The Witness: Referring to table for Sunday May 7, 1939, you will note that for the hour ending 4:00 A.M., 21,000 kilowatt hours are recorded as being received from the Connecticut Power Company South Meadow—were being received at the Connecticut Power South Meadow substation from Massachusetts, over the Hartford-Agawam lines. No energy was received from the Hart-

ford Electric Light Company. 2,000 kilowatt hours were delivered to the Hartford Electric Light Company. 18,000 kilowatt hours were delivered to the CP-1 and CP-2 lines. Flow Diagram C illustrates this condition by showing Massachusetts energy delivered to South Meadow, and from South Meadow to The Hartford Electric Light Company, and to the CP-1 and CP-2 lines. The table further shows for the hour ending 4:00 A.M., that 5,300 kilowatt hours were generated at Falls Village, as compared to 600 kilowatt hours used in the Housatonic division, and 16,000 kilowatt hours delivered to Central Hudson Gas & Electric Corporation. It is apparent that the Falls Village generation was insufficient to take care of the Housatonic division load, and the delivery to Central Hudson Gas & Electric Corporation, and because of this, that energy from South Meadow substation was delivered to Central Hudson Gas & Electric Corporation. Under these conditions, it is evident that all points between [*1491*] the delivery to Central Hudson Gas & Electric Corporation and South Meadow must have been supplied with energy received from the South Meadow substation. As I have just stated, the energy received from South Meadow substation was Massachusetts energy, and it is evident that all points along the CP-1 and CP-2 lines were served with Massachusetts energy. The table further shows delivery of energy to Winsted from The Torrington Electric Light Company, and that the generation at Robertsville was zero. It is therefore evident that Winsted made use of only Massachusetts energy during the hour ending 4:00 A.M.

By Mr. Wahrenbrock: *Q* May I interrupt to ask whether in referring to the table in your testimony which you have just given, you are referring to the table for Sunday, May 7, 1939, which is a part of Exhibit No. 61 for Identification? *A* That is correct.

Q Will you continue with your explanation. *A* The explanation I made in connection with Flow Diagram A would apply to all other points on the line, and it would be needless repetition to detail them. Flow Diagram C correctly illustrates the fact that

Massachusetts energy is supplied to all points along CP-1 and CP-2 lines under such conditions.

Q How many instances have you tabulated in Exhibit [*1492*] No. 61 for Identification in which the flow of energy was as illustrated by Diagram C, for two or more successive hours? *A* During nine of the twenty-one days selected for tabulation, the energy conditions were as shown by Flow Diagram C for two or more consecutive hours. The days are as follows: May 2, 1937, June 1, 1937, July 5, 1937, August 1, 1938, April 30, 1939, May 7, 1939, April 15, 1940, May 29, 1940, May 30, 1940.

Q Mr. Miller, in all instances, are the applicable flow diagrams shown for each hour on the tables which are Exhibit 61 for Identification? *A* The applicable flow diagram is shown in the table for all hours in those tables.

Trial Examiner: May I interrupt the examination by counsel to ask the purpose of certain marks—I believe they are asterisks, in the column or in the line, rather, marked "Flow Diagram", in various columns of the various pages. I think the witness could explain the purpose of those asterisks.

Mr. Wahrenbrock: They will be explained. If you would like at this time—

Trial Examiner: I would like to have them explained now. It may clarify the point. I believe they have not applied to any particular columns which we have had to do with so far.

Mr. Wahrenbrock: That was our reason for postponing the explanation, Mr. Examiner.

[*1493*] Trial Examiner: All right, we will get the explanation in due time. I wanted to know if there was one.

Mr. Wahrenbrock: There is one. I might say at this point that the first page of Exhibit No. 61 for Identification contains a note on that point which will be explained later.

Trial Examiner: All right. Counsel may proceed with the witness.

By Mr. Wahrenbrock: *Q* Have you tabulated for one of the days for 1941 a flow condition which is illustrated by Flow Dia-

gram C? *A* Yes. During one hour of April 27, 1941, the flow condition was as illustrated by Flow Diagram C.

Q Will you now describe Flow Diagram I to which you have referred?

Trial Examiner: I would suggest that this would be a good time to take a short recess. We will recess for five minutes.

(At this point a short recess was taken, after which the hearing was resumed.)

Trial Examiner: The hearing will be in order.

By Mr. Wahrenbrock. *Q* Will you now describe Flow Diagram I? *A* Flow Diagram I illustrates the flow condition when energy transmitted from Massachusetts and received at South Meadow substation is transmitted to CP-1 and CP-2 lines, and no energy is received at The Hartford Electric Light Company, [*1494*] during hours when the generation at Falls Village was less than the Housatonic division load. This diagram is the same as Flow Diagram A, from Massachusetts, that is, from the right-hand side of the diagram leftwards, up to but not including Falls Village. As in the case of Flow Diagram A, Massachusetts energy is transmitted to Middletown and Portland, to Bristol, Tomaston and Torrington. From Torrington, Massachusetts energy is transmitted by The Connecticut Light and Power Company to Winsted for its service area there. Massachusetts energy may be transmitted to Central Hudson Gas & Electric Corporation. It will be noted that under this condition the Housatonic division is supplied with energy generated in Falls Village, and with energy received from Massachusetts.

Q How many instances have you tabulated when flow conditions are as illustrated in Flow Diagram I of Exhibit No. 62 for Identification? *A* Two, occurring on May 12, 1937, and May 22, 1939. The days tabulated were selected without reference to Flow Diagram I, so that the number of instances tabulated are very few.

Q Were there any periods of time in which only Massachusetts energy was supplying the requirements of some but not all of the

loads supplied by CP lines from Hartford to Falls Village?
[1495] *A* Yes.

Q Have you prepared diagrams illustrating such flow conditions? *A* Yes. Flow diagram E and Flow Diagram G. Flow Diagrams E and G are contained in the exhibit, of which Flow Diagram A is a part.

Q Will you explain Flow Diagram E? *A* Flow Diagram E illustrates the flow conditions when energy transmitted from Massachusetts and received at South Meadow substation is transmitted to CP-1 and CP-2 lines, and simultaneously no energy is being received from The Hartford Electric Light Company, during hours when the generation at Falls Village is less than the combined deliveries to the Housatonic division, to the Central Hudson Gas & Electric Corporation, and to Torrington. This diagram is the same as Flow Diagram A from Massachusetts, that is, from the right-hand side of the diagram leftwards, up to but not including Torrington. As in the case of Flow Diagram A, Massachusetts energy is transmitted to Middletown and Portland, to Bristol and to Tomaston. It will be noted that under this condition, Torrington is supplied with Connecticut energy generated both in Falls Village and in Hartford, and with Massachusetts energy.

[1496] *Q* Excuse me. Did I understand you to say that under the conditions illustrated by Flow Diagram E, Torrington is supplied with Connecticut energy generated at both Falls Village and at Hartford? *A* If I said so, I was mistaken. Under this condition Torrington is supplied with Connecticut energy generated in Falls Village and with Massachusetts energy. Shall I continue?

Q Will you, please? *A* From Torrington, Connecticut energy generated in Falls Village and Massachusetts energy are transmitted by The Connecticut Light and Power Company to Winsted for its service area there. All points to the west of Torrington are supplied with Connecticut energy generated in Falls Village.

Q Will you now illustrate by reference to a particular hour and some day the energy conditions which make Flow Diagram E

applicable. *A* Referring to the table for Monday, May 29th, 1939, and the hour ending 12 P.M. in this table—

Q That is Exhibit No. 61 for identification? *A* That is right.

Q I think we have found it now. *A* Referring to the table for Monday, May—

Mr. Branch: Just a moment.

Mr. Wahrenbrock: When I said "we" I meant to say that all of us have found it.

[*1497*] Trial Examiner: Just a moment, please.

Mr. Wahrenbrock: Have you found it, Mr. Branch?

Mr. Branch: Yes, sir.

By Mr. Wahrenbrock: *Q* Will you continue, Mr. Miller? *A* Referring to the table for Monday, May 29th, 1939, and the hour ending 12 P.M. in that table, you will note that 22,000 kilowatt hours were received at South Meadow substation, Hartford-Agawam lines, from Massachusetts. Flow diagram E, which shows Massachusetts energy flowing to South Meadow substation, corresponds to that condition. No energy was received from the Hartford Electric Company and the table shows the 13,000 kilowatt hours were delivered to The Hartford Electric Light Company. Flow Diagram E accordingly shows Massachusetts energy flowing to the Hartford Electric Light Company. During this hour 8,000 kilowatt-hours were delivered by South Meadow substation to C.P. 1 and C.P. 2 lines. Since the only energy supplied to South Meadow substation during this hour was delivered from Massachusetts, the 8,000 kilowatt-hours delivered to C. P. 1 and C. P. 2 lines were Massachusetts energy. Flow Diagram E, which shows the Massachusetts energy flowing to C. P. 1 and C. P. 2 lines, corresponds to this condition. [*1498*] The table further shows that the Falls Village generation was 1,000 kilowatt-hours. The delivery to the Housatonic Division was 800 kilowatt hours. There was no delivery to Central Hudson Gas & Electric Corporation, and the delivery to The Torrington Electric Light Company was 1,810 kilowatt hours. It is therefore evident that the Falls Village generation was not sufficient to supply the Housatonic

Division load, and the entire delivery to The Torrington Electric Light Company. Part of the energy delivered to Torrington must have been energy delivered to the C. P. 1 and C. P. 2 lines at South Meadow substation. It is also evident that the energy supplied to all points between Torrington and South Meadow substation must have been delivered to C. P. 1 and C. P. 2 lines at South Meadow substation; since the only energy delivered to the C. P. 1 and C. P. 2 lines at South Meadow substation was that transmitted from Massachusetts, Massachusetts energy alone was delivered to all the points from South Meadow substation up to but not including Torrington. During the hours of this day the East Hampton District had no other source of supply excluding the small industrial source, so it is evident that Massachusetts energy, the only energy received at the Middletown Division during this hour, [*1499*] must have been transmitted to The Connecticut Light and Power Company at Portland.

Q May I interrupt to ask what "hours" you refer to by the "hours of this day". *A* I am referring to the hours of Monday, May 29, 1939.

Q Are you referring to all the hours of the day or those shown on the table? *A* These tables are constructed to show energy conditions during certain selected hours, and in all of my explanations I am only referring to the hours of a day which are shown in the table.

Q With that explanation will you continue?

Trial Examiner: I would like to ask one question. The witness has just referred to the matter of the small industrial station. It might be well to find out its relation to the load in that particular district.

The Witness: Mr. Examiner, I have previously in my testimony, in giving the energy purchases and the energy generation in the East Hampton District, stated the amounts of energy purchased by the East Hampton District from this industrial company, the Brownell Company, and I think if you will refer to that you will find that I have covered it.

Trial Examiner: You haven't covered the question I had in

mind, the amount of energy that it might deliver at any given point, the maximum amount that it might deliver during any hour. [*1500*] In other words, the capacity of that station, what it could produce during an hour.

The Witness: I am unable to give you the information as to that station. It is actually a customer of The Connecticut Light and Power Company and operates a small hydro-plant. I attempted to look it up in various publications of the Commission and I was unable to locate that plant. It is apparently quite small. Probably, during its operation, when the plant is operating all of the energy of that plant is used within the plant, in addition to energy purchased from The Connecticut Light and Power Company, and energy delivered to The Connecticut Light and Power Company occurs probably at hours when the plant is not operating, that is, the industrial plant, is not operating.

Trial Examiner: Does counsel propose to put into the record through any witness to be called later, the capacity of this small industrial plant that has been referred to several times, but which the total amount purchased, I believe, is in the record? I understand this is on The Connecticut Light and Power Company's lines, is it not?

The Witness: In the East Hampton District.

Mr. Wahrenbrock: It is a Connecticut Power Company facility and at the moment I am not advised whether that is shown in the reports to the Federal Power Commission or not. If it [*1501*] is so shown, I am sure we can show it. If it is not, we will have to make such inquiry as might elicit it from the witnesses that are under subpoena.

Trial Examiner: Do you expect to call employees of the respondent as witnesses? They might have this information.

Mr. Wahrenbrock: I expect to call employees of the respondent that I think should have that information.

Trial Examiner: All right.

By Mr. Wahrenbrock: *Q* I wish to clarify this matter of the hours during the day, Monday, May 29, 1939, in which you wish

to state, Mr. Miller, the absence of energy other than Massachusetts energy at South Meadow. Directing your attention to the line which shows the receipts from The Hartford Electric Light Company, will you state which hours you intended to refer to? *A* My description referred to the hour ending 12 P.M. on Monday, May 29th, 1939.

Q Was that the only hour that the same situation prevailed? I am not sure that you can answer that offhand. *A* I can answer that question. The flow condition which can be illustrated by flow diagram E occurred during the hour ending 9 P.M. of that same day, Monday, May 29th, 1939.

Q Did it occur during any other hour that day? *A* It also occurred on the hour ending 1 A.M. of that day.

[*1502*] *Q* That calls for a further explanation, but I would like not to go into that at this time. Did it occur during the hour ending 12 P.M.? *A* 12 P.M.?

Q Yes. *A* Yes.

Q It occurred during that hour? During those hours did the East Hampton District have any other source of supply, leaving out of account the small industrial source that you have referred to, during those hours, excluding the industrial source? *A* During those hours, excluding the industrial source, the only source of supply to the East Hampton District was the delivery from the Middletown Division, which in turn gets its energy from the C.P. 1 and C.P. 2 lines.

Q And during those hours what was the source of energy which was delivered to the Middletown Division as shown by the table and the diagram? *A* Energy received from Massachusetts.

Q And that is the condition illustrated by the diagram? *A* I can be specific for those hours, if you want.

Q I wish you would, please. *A* Taking up the hour ending 1:00 A.M.—

Q I suggest that you take up the hour ending 9:00 P.M. *A* All right. The hour ending 9:00 P.M., the table [*1503*] shows 16,000 kilowatt-hours of electric energy received at South Meadow sub-

station from Massachusetts, over the Hartford-Agawam lines. The table further shows that no energy was received from The Hartford Electric Light Company. The table shows 3,000 kilowatt-hours delivered to The Hartford Electric Light Company and the table shows 11,000 kilowatt-hours delivered to the C. P. 1 and C. P. 2 lines. Since the only energy received at South Meadow substation during that hour is the energy received from Massachusetts, the deliveries, both to The Hartford Electric Light Company and to the C. P. 1 and C. P. 2 lines must have been Massachusetts energy.

Q Now, will you continue with your explanation of the applicability of the flow diagram to conditions prevailing? *A* I believe I have stated that—I should say that during the hour ending 12:00 P.M. of this day the East Hampton District had no other source of supply, excluding the small industrial source, so that is evidence that Massachusetts energy, the only energy received at the Middletown Division during this hour, must have been transmitted to The Connecticut Light and Power Company at Portland. Flow Diagram E properly illustrates the flow of Massachusetts energy to Middletown and to the Connecticut Light and Power Company at Portland. The table shows 3,000 kilowatt hours delivered to The Connecticut Light and Power Company at [*1504*] Bristol during the hour ending 12.00 P.M. As was just explained, this energy was transmitted from Massachusetts. Flow Diagram F properly illustrates the flow of Massachusetts energy to Bristol. The flow diagram also properly illustrates the flow of Massachusetts energy to the Thomaston Division. Since the generation at Falls Village exceeded the Housatonic Division load by only 200 kilowatt-hours, it is evident that the greater part of the delivery to Torrington must have been energy transmitted from Massachusetts. Flow Diagram E properly shows the flow of Massachusetts and Connecticut energy to Torrington. The table shows the recorded delivery of 800 kilowatt-hours to Winsted. Since Torrington received both Massachusetts and Connecticut energy, the delivery to Winsted included both Massachusetts and Connecticut energy.

Flow Diagram E properly illustrates the flow of Massachusetts and Connecticut energy to Torrington. The Robertsville plant generated 200 kilowatt-hours for use in the Winsted District. Flow Diagram E also properly shows that there may have been a flow from the Robertsville plant. The delivery to the Housatonic Division was generated in Connecticut and the Flow Diagram E properly illustrates this. As noted previously, the delivery to Central Hudson Gas & [*1505*] Electric Corporation was zero. The broken arrow in the Flow Diagram indicates that the flow to Central Hudson Gas & Electric Corporation may have been zero. The analysis of the data of this table shows that Flow Diagram E properly illustrates the flow conditions during the hour. Under this condition, Torrington was a balance point.

Q What do you mean by "balance point"? *A* Where several loads are distributed along a line which is supplied simultaneously by energy from sources at both ends, the point in the line which marks the division between the points supplied by the sources at one end and the points supplied by the sources at the other end, is called the balance point.

Q What account did you take of losses in the lines and in the substations? *A* I have not calculated or estimated the losses, because figures are not available. Flow Diagram E applies to this hour in the manner I have indicated. The effect of taking losses into account would not have been sufficient to affect my conclusions. At most they would have tended to move the balance point from Torrington to the left.

Q Will you explain your answer, in so far as you say that you have not calculated or estimated the losses, because [*1506*] the figures are not available? To what extent were they not available and what other considerations, if any—or did any other considerations enter into your decision? *A* To have calculated the losses I would have had to know the exact minute to minute flow conditions during an hour. I would have had to know all the characteristics of the lines and of the transformers and other equipment, and it would have involved for each hour a rather large—unduly

large, I should say—amount of computation, which, as I have stated, was unnecessary, because the effect of not calculating those losses only tends to move, as I say, the balance point in this particular case, from Torrington to the left.

Q And would any tendency to move the balance point from Torrington to the left affect the fact that you have stated, that Massachusetts energy was supplied to the Winsted District? *A* No.

Mr. Branch: Just a moment. May we have that question read?

Trial Examiner: The question will be read by the reporter for the benefit of respondent's counsel.

(Question read by the reporter.)

A No. The effect at Torrington and Winsted might have been to indicate that at this particular hour the Connecticut energy—that either no Connecticut energy or a very small amount of Connecticut energy was delivered to Torrington and Winsted, but [1507] it would not in any way affect the fact that during this hour Massachusetts energy was delivered to Torrington and to Winsted.

Q How many instances of flow conditions, corresponding to Flow Diagram E, have you tabulated? *A* Three hours on Monday, May 29th, 1939. The days tabulated were selected without reference to Flow Diagram E, so that the number of instances tabulated is few.

Q Reverting to your preceding answer, if the consideration of losses had shown sufficient losses to actually move the balance point to the left of Torrington, would that have had the effect of making a different flow diagram applicable, to illustrate the flow condition? *A* Yes. If the losses were sufficiently great, so that the 200 kilowatt-hours, by which the generation at Falls Village exceeded the Housatonic Division load were consumed in a line before reaching Torrington, the balance point might have been at either some point between Torrington and Falls Village or the balance point may have been at Falls Village, in which case Flow Diagram I would have applied.

Q Will you now describe Flow Diagram G, to which you have referred? *A* Flow Diagram G illustrates the flow condition and energy generated in Massachusetts and received at the South Meadow Substation is transmitted to C.P. 1 and C.P. 2 lines, [*1508*] and simultaneously no energy is received from The Hartford Electric Light Company during hours when the generation at Falls Village was less than the combined deliveries to the Housatonic Division, the Central Hudson Gas & Electric Corporation, to Torrington and to Bristol. This diagram is the same as Flow Diagram A from Massachusetts. That is from the right-hand side of the diagram, leftward up to but not including Bristol. As in Flow Diagram A, Massachusetts energy is transmitted to Middletown and to Portland, and it will be noted that under this condition Bristol is supplied with Connecticut energy generated at Falls Village and with Massachusetts energy.

Mr. Branch: What are you talking about?

The Witness: Flow Diagram G. All points to the west of Bristol are supplied with Connecticut energy generated at Falls Village.

By Mr. Wahrenbrock: *Q* How does Flow Diagram C—excuse me, I misspoke myself. How does Flow Diagram G, which you have just been discussing, differ from Flow Diagram E which you have previously discussed? *A* Flow Diagram G differs from Flow Diagram E only in the fact that the balance point is at Bristol instead of at Torrington.

Q How many instances have you tabulated flow conditions of [*1509*] the kind illustrated by Flow Diagram G? *A* I have tabulated flows illustrated by the Flow Diagram G on the following days: May 12th, 1937, May 30th, 1938, August 1, 1938, November 26, 1938, May 29, 1939, June 1, 1939 and May 29, 1940. The dates tabulated were selected without reference to Flow Diagram G.

Q Will you explain what you mean when you say the dates tabulated were selected without reference to Flow Diagram G? *A* The criteria used by me in determining which days I wished to

tabulate information for did not include the particular type of flow illustrated by Flow Diagram G. It was after I had received the data and was preparing it that I discovered that I should properly show flow conditions as illustrated by Flow Diagram G and have done so in the table.

[*1510*] *Q* In other words, is it true to say that in selecting the dates which you would set forth in these tables, you did not select the days, in the first place, for the purpose of showing the type of flow which is illustrated by Diagram G? *A* That is correct.

Q You selected the days to illustrate other types of flows, and you found the flows which are illustrated by Flow Diagram G occurring on such days? *A* That is correct.

Q And was that true also with reference to your explanation of the number of days in which flows illustrated by Flow Diagram E were tabulated? *A* I did not select any days to illustrate the flow conditions as shown by Flow Diagram E.

Q In your study, did you ascertain whether there were instances in which the electric energy requirements of all the loads supplied by the Connecticut Power Company lines, from Hartford to Falls Village, were supplied only by electric energy from Massachusetts and from Hartford? *A* I did.

Mr. Branch: May I have that question read?

Trial Examiner: The question will be read for the benefit of counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

[*1511*] By Mr. Wahrenbrock: *Q* Have you illustrated that condition of flow by a diagram? *A* Yes. I have illustrated it by flow Diagram B.

Q Will you describe Flow Diagram B which is a part of Exhibit No. 62 for Identification? *A* Flow Diagram B illustrates the flow conditions when energy generated in Massachusetts and energy generated in The Hartford Electric Light Company system are received at the South Meadow substation and delivered to the CP-1 and CP-2 lines, during hours when the generation at Falls

Village is zero. On this diagram, as in the others, Massachusetts energy is shown in red, and Connecticut generated energy is shown in blue. Massachusetts energy is transmitted from Massachusetts to South Meadow substation. Energy from the Hartford Electric Light Company is also transmitted to South Meadow substation. Both Massachusetts and Connecticut energy are transmitted to CP-1 and CP-2 lines. Massachusetts energy and Connecticut energy are transmitted to Middletown and Portland. Massachusetts Energy and Connecticut Energy are transmitted to Bristol, to The Connecticut Light and Power Company. Massachusetts energy and Connecticut energy are transmitted to Bristol—I am sorry. Massachusetts energy and Connecticut energy are transmitted to the Tomaston division of The Connecti- [*1512*] cut Power Company, and to Torrington; at Torrington, part of the Massachusetts energy and part of the Connecticut energy are used to supply the whole load of The Torrington Electric Light Company. Part of the Connecticut and part of the Massachusetts energy are sold at wholesale to The Connecticut Light and Power Company which transmits the energy to Winsted for consumption in its service area there. The arrow showing the flow from the Robertsville plant is broken to indicate that at times no energy is being delivered from the Robertsville plant. This is true when the Robertsville plant is not generating. Massachusetts energy and Connecticut energy are transmitted to Falls Village and to the Housatonic division. The arrow indicating the Central Hudson Gas & Electric Corporation is broken because the flow under this condition may be zero.

Q Will you now illustrate by reference to a particular hour of some day, the energy conditions to which Flow Diagram B are applicable?

Mr. Branch: May I have the question, please?

Trial Examiner: The question will be read for the benefit of counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: Referring to the table of Monday, May 29, 1939—

[*1513*] By Mr. Wahrenbrock: *Q* In Exhibit— *A* In Exhibit No. 61, I believe, and the hour ending 1:00 P.M. on this table, you will note that 13,000 kilowatt hours were received at South Meadow substation from Massachusetts. Flow Diagram B properly illustrates flow of Massachusetts energy to South Meadow substation. 2,000 kilowatt hours of electric energy were received at South Meadow substation from The Hartford Electric Light Company, and no energy was delivered to The Hartford Electric Light Company. Flow Diagram B properly illustrates the flow of Hartford energy, or I should say Connecticut energy from Hartford to South Meadow substation. 14,000 kilowatt hours were delivered from South Meadow substation to CP-1 and CP-2 lines. Since the energy delivered to the South Meadow substation was transmitted from Massachusetts and Hartford, the CP-1 and CP-2 lines received Massachusetts and Hartford energy. Flow Diagram B properly illustrates flow of Massachusetts and Connecticut energy to CP-1 and CP-2 lines. The table showed that during this hour, the Falls Village generation was zero. Therefore, as explained previously in connection with Flow Diagram A, all the energy on CP lines was received from South Meadow substation. Since the delivery of energy at South Meadow substation included both Massa- [*1514*] chusetts and Connecticut energy, all points along the CP lines received Massachusetts and Connecticut energy. Flow Diagram B properly illustrates the flow of Massachusetts and Connecticut energy at all points along the CP lines, including Middletown, The Connecticut Light and Power Company at Portland, The Connecticut Light and Power Company at Bristol, the Tomaston division of The Connecticut Power Company, The Torrington Electric Light Company, and the Housatonic division of The Connecticut Power Company. The recorded delivery to Winsted of 800 kilowatt hours from Torrington evidently included both Massachusetts and Connecticut energy, and Flow Diagram B properly shows that.

Q How many instances have you tabulated a flow condition illustrated by Flow Diagram B? *A* I have tabulated instances of flow conditions corresponding to Flow Diagram B as occurring on the following days: May 12, 1937, June 1, 1937, May 13, 1938, November 26, 1938, May 22, 1939, May 29, 1939, June 1, 1939, September 3, 1940, May 26, 1941.

Q Were there any other instances during which the electric energy requirements of all loads supplied by the CP lines from Hartford to Falls Village were supplied only by energy from Massachusetts and from Hartford? *A* There were.

Q Have you flow diagrams illustrating such conditions? [*1515*] *A* Yes. Flow diagrams D and K.

Q Will you now describe Flow Diagram D, of Exhibit No. 62 for Identification? *A* Flow Diagram D illustrates the flow condition when both energy generated in Massachusetts and energy generated in The Hartford Electric Light Company system are received at the South Meadow substation and delivered to CP-1 and CP-2 lines during hours when generation in Falls Village plant was less than the combined deliveries to the Housatonic division and to the Central Hudson Gas & Electric Corporation. This diagram is the same as Flow Diagram B from Massachusetts, that is, from the right-hand side of the diagram leftwards, up to but not including Falls Village. As in the case of Flow Diagram B, Massachusetts and Connecticut energy is transmitted to Middletown and Portland, to Bristol, Tomaston and Torrington, from Torrington, Massachusetts and Connecticut energy is transmitted by The Connecticut Light and Power Company to Winsted for its service area there. It will be noted that under this condition the Housatonic division is entirely supplied with electric energy generated in Falls Village, and that the Central Hudson Gas & Electric Corporation is supplied with Connecticut energy generated in both Falls Village and in Hartford, and with Massachusetts energy.

Q How many instances did you tabulate of the flow con- [*1516*] ditions illustrated by Flow Diagram D? *A* I have tabu-

lated instances of flow conditions corresponding to Flow Diagram D as occurring on four days in the—I will correct that. On five days, in the years 1937, 1939, 1940 and 1941, as foilows: July 5, 1937, May 7, 1939, April 15, 1940, April 26, 1941, and April 27, 1941.

Q Will you describe Flow Diagram K. *A* Flow Diagram K illustrates the flow condition when energy generated in Massachusetts and energy generated in the Hartford Electric Light Company system are received at South Meadow substation and delivered to CP-1 and CP-2 lines during hours when the generation at the Falls Village plant was less than the Housatonic division load. This diagram is the same as Flow Diagram B, from Massachusetts, that is, from the right-hand side of the diagram, leftwards, up to but not including Falls Village. As in the case of Flow Diagram B, Massachusetts and Connecticut energy is transmitted to Middletown and Portland, to Bristol, Tomaston and Torrington. From Torrington, Massachusetts and Connecticut energy is transmitted by The Connecticut Light and Power Company to Winsted for its service area there. Massachusetts and Connecticut energy may be transmitted to the Central Hudson Gas & Electric Corporation. It will be noted that under this condition the Housatonic division is supplied with Connecticut energy generated both in Falls [*1517*] Village and in Hartford, and with Massachusetts energy.

Q What kind of—what have you to say about the energy which is delivered by The Connecticut Light and Power Company, or is transmitted by The Connecticut Light and Power Company to Winsted for its service area there? *A* I think I stated that from Torrington, Massachusetts and Connecticut energy is transmitted by The Connecticut Light and Power Company to Winsted for its service area there.

Q How many instances did you tabulate the flow of electric energy as shown by Diagram K? *A* I have tabulated instances of flow conditions illustrated by Diagram K during the following days in the years 1938 and 1939: May 13, 1938, November 26, 1938, June 1, 1939.

Q Were there any periods of time when only Massachusetts and Hartford energy were supplying the requirements of some, but not all, the loads supplied by the CP lines from Hartford to Falls Village? *A* Yes.

Q Have you a Flow Diagram to illustrate such flows? Have you flow diagrams to illustrate such flows? *A* Yes. Flow Diagrams F and H.

Q Will you describe Flow Diagram F of Exhibit No. 62 for Identification? *A* Flow Diagram F illustrates the flow conditions when energy generated in Massachusetts and energy generated in [*1518*] The Hartford Electric Light Company system are received at the South Meadow substation and delivered to CP-1 and CP-2 lines, during hours when the generation at Falls Village was less than the combined deliveries to the Housatonic division, to the Central Hudson Gas & Electric Corporation, and to Torrington. This diagram is the same as Flow Diagram B from Massachusetts, up to but not including Torrington. As in the case of Flow Diagram B, Massachusetts energy and Connecticut energy are transmitted to Middletown and Portland, to Bristol and to Tomaston. It will be noted that under this condition Torrington is supplied with Connecticut energy generated in both Falls Village and Hartford, and with Massachusetts energy. From Torrington, Connecticut energy generated at Falls Village and in Hartford, and Massachusetts energy, is transmitted by The Connecticut Light and Power Company to Winsted for its service area there. All points on CP-1 and CP-2 lines west of Torrington are supplied with Connecticut energy generated in the Falls Village plant.

Q Where is the balance point under the flow conditions which are illustrated by Flow Diagram B? *A* As in the case of Flow Diagram E, the balance point is at Torrington for conditions illustrated by Flow Diagram F.

Q How many instances did you tabulate of flow conditions illustrated by Flow Diagram F? [*1519*] *A* I have tabulated the following instances of flow conditions illustrated by Flow Diagram

F: January 15, 1939, May 22, 1939, May 29, 1939, September 3, 1940, April 26, 1941, May 26, 1941.

Q Will you now describe Flow Diagram H to which you have referred, of Exhibit No. 62 for Identification. *A* Flow Diagram H illustrates the flow conditions when energy generated in Massachusetts and energy generated in the Hartford Electric Light Company system is received at the South Meadow substation and delivered to the CP-1 and CP-2 lines during hours when the generation at Falls Village was less than the combined deliveries to the Housatonic division, Central Hudson Gas & Electric Corporation, Torrington and Bristol. This diagram is the same as Flow Diagram B, from Massachusetts up to but not including Bristol. As in the case of Flow Diagram B, Massachusetts energy and Connecticut energy is transmitted to Middletown and Portland. It will be noted that under this condition, Bristol is supplied with Connecticut energy generated at the Falls Village and at Hartford, and with Massachusetts energy. All other points west of Bristol are supplied with energy generated at Falls Village.

Q Where was the balance point under the conditions illustrated by Flow Diagram H of Exhibit No. 62 for Identification? *A* At Bristol, as in the case of Flow Diagram G. [*1520*] *Q* How many instances did you tabulate of flow conditions illustrated by Flow Diagram H? *A* I have tabulated instances of flow conditions illustrated by Flow Diagram H during the following twelve days: May 12, 1937, June 1, 1937, May 13, 1938, August 1, 1938, November 26, 1938, January 15, 1939, May 22, 1939, June 1, 1939, April 15, 1940, May 29, 1940, April 26, 1941, April 27, 1941. The days tabulated were selected without reference to conditions represented by Flow Diagram H.

Q Will you state the basis on which you had selected the 21 days which are covered by Exhibit No. 61 for Identification? *A* As I have stated before, the study of the one line diagram of The Connecticut Power Company, disclosed that the two sources of energy in the CP-1 and CP-2 lines—I should say the two main sources of energy in the CP-1 and CP-2 lines were South Meadow

substation and Falls Village. Preliminary examination of the Connecticut Valley Power Exchange log sheets revealed that at times the Falls Village generation was zero, or very small, simultaneously with the receipt of energy at South Meadow substation from Massachusetts. Also Connecticut Valley Power Exchange log sheets revealed that at times the delivery of energy to Central Hudson Gas & Electric Corporation exceeded or was quite close to the generation [*1521*] at Falls Village, simultaneously with the receipt of energy at South Meadow substation from Massachusetts. It became immediately apparent that a selection of days having hours when the generation at Falls Village was zero, or less than the delivery to the Central Hudson Gas & Electric Corporation, simultaneously with the receipt at South Meadow of electric energy from Massachusetts, would enable the establishment of the fact that Massachusetts energy was delivered at times to all points served from the CP-1 and CP-2 lines. Accordingly, lists of such days were prepared from an inspection of the Connecticut Valley Power Exchange log sheets for the period from January 1, 1937 to May 26, 1941.

Q How many days—

Mr. Branch: Excuse me. May I have that last answer read?

(Whereupon the last answer as above recorded, was read by the reporter.)

By Mr. Wahrenbrock: *Q* How many days were so listed by you? *A* 321.

Q During those hours in which electric energy is received at The Connecticut Power Company substation at South Meadow from the Hartford-Agawam line and from the Hartford Electric Light Company, and no electric energy is delivered [*1522*] to any of those, as illustrated by Flow Diagrams B, D, F, H, and K, does the ratio of receipts from Massachusetts to the total of receipts from Massachusetts and Hartford, as can be computed from the table, indicate anything at all about the ratio of electric energy from Massachusetts to electric energy from Hartford and Massachusetts, being supplied The Connecticut Light and Power Com-

pany at Portland, Bristol, and Torrington, as shown by your study?

Mr. Branch: Just a minute, please. Maybe I can get at it this way: Does your question apply merely to the ratio on the particular 21 days that are shown here?

Mr. Wahrenbrock: It doesn't apply to the days.

Trial Examiner: I think it would be better if counsel addressed the Chair.

Mr. Branch: Excuse me, sir. May I ask through you whether the question was directed to ascertaining the ratio of time or days or hours in the 21 days, or what?

Trial Examiner: Can you make a statement for the benefit of counsel?

Mr. Wahrenbrock: Yes, I can clear that readily. It is not a matter of ratio of time a certain type of flow is taking place. It is a question of the ratio of energy from one source to energy from another source, at the same instance.

[*1523*] Mr. Branch: May I inquire what time you have in mind, whether it is merely some of the times shown during these 21 days?

Mr. Wahrenbrock: It is a general question.

Mr. Branch: Well, if it is a general question as to all times, I object, because certainly it hasn't been shown that any study has been made sufficient to make even an estimate as to all times. The witness apparently has confined his studies to a limited number of days, and it doesn't seem to me proper to try to draw any conclusion from that unless a good deal more appears than has appeared here.

Trial Examiner: I think the witness may testify as to ratios during the periods in which he made a study.

By Mr. Wahrenbrock: *Q* In making your answer, will you limit it to the conditions which you studied? *A* Yes. Up to the balance point, if any, on the CP lines the delivery to the loads along those lines will have a ratio of Massachusetts energy close

to that which can be computed from the deliveries to South Meadow substation.

Q Will inaccuracies of readings of meters cause the computed ratio of Massachusetts energy to the total of Massachusetts and Hartford energy to differ from the true value during an hour, and I will ask you again to confine your answer to the conditions prevailing during the period covered by [*1524*] your study? *A* Yes. As I explained previously, a meter reading record may differ from the actual flow during one hour by a maximum of one dial unit. This, of course, will affect the computed ratio of Massachusetts energy. It is evident, of course, that over the course of several hours a high ratio computed during one hour must be balanced by a low ratio computed during another hour. Let me emphasize that the inaccuracy of reading will never operate to show a flow of Massachusetts energy to any load during an hour when in fact no such flow actually took place during that hour.

Q With reference to this table, which is Exhibit 61 for Identification, will you state the number of hours you have tabulated the receipt at Bristol of energy received in whole or in part from Massachusetts?

Q Every hour tabulated in these tables illustrates a flow condition in which some Massachusetts energy is received at Bristol.

Q Can you state the number of instances that you have tabulated in this table, which is Exhibit 61 for Identification, in which some Massachusetts energy was delivered to the Connecticut Light and Power Company at Portland prior to July 1, 1939?

Mr. Wahrenbrock: Would you like to have the question [*1525*] read?

Mr. Branch: Yes.

Trial Examiner: The question will be read for the benefit of respondent's counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: Every hour tabulated in this table for dates prior to July 1, 1939, illustrates a flow condition in which some Massa-

chusetts energy is delivered to The Connecticut Light and Power Company at Portland.

Trial Examiner: May I at this point ask one question? Will the witness state why there is any particular reason that only certain hours were used? Certain hours appear to be omitted on various days of the study. Is there any particular reason for that, or is it just an arbitrary choice of hours?

Mr. Wahrenbrock: Mr. Examiner, is that addressed to counsel?

Trial Examiner: That is addressed to the witness.

The Witness: There are several reasons for that. In portraying or making up these flow diagrams and putting the hours in the table, I was endeavoring to show the flow of Massachusetts energy to points along CP lines and to The Connecticut Light and Power Company at Winsted, Bristol and East Hampton. During some hours of these days the flow [*1526*] conditions were such that I would not be able to show that, and such hours were of necessity omitted from the table as not being anything I was attempting to show. Also, there are some hours when the information at Torrington regarding the delivery of energy to Winsted was such that I could not in good conscience state that energy was being delivered to Winsted during those hours, and for me to include those hours would have required a complete duplication of all the flow diagrams I have in order to illustrate a condition when energy was not being delivered to Winsted from Torrington during hours when all the other conditions shown by those flow diagrams did apply.

Trial Examiner: Then you have only picked out the hours in which one or other of the flow diagrams from A to K inclusive, which appear in Exhibit 62, and you have used those hours in the preparation of Exhibit 61?

The Witness: Exactly.

Trial Examiner: I think that clarifies that point.

Mr. Wahrenbrock: I was just going to go into the question of how these were selected. You have anticipated some of the questions I was going to ask.

By Mr. Wahrenbrock: *Q* How did you select the 21 days covered by the data in Exhibit 61 for Identification from the 321 days which you have just referred to in your testimony? [*1527*] *A* From those 321 days, 34 days were selected showing such flows for two or more consecutive hours.

Q What do you mean "such flows"? It has been some time since you were interrupted. *A* I stated that the basis of selection was days showing hours during which energy was being received from Massachusetts at South Meadow substation and the Falls Village generation was either zero or less than the Housatonic division load and the delivery to the Central Hudson Gas & Electric Corporation.

Mr. Wahrenbrock: May I have the witness's answer to the preceding question read, please?

(Whereupon the last answer as above recorded, was read by the reporter.)

Trial Examiner: I don't believe that so far the answer is responsive.

Mr. Wahrenbrock: It is partly responsive. It doesn't exhaust the subject, Mr. Examiner. I will bring that out by a couple of further questions.

By Mr. Wahrenbrock: *Q* There were instances in which such flows occurred for considerably more than two consecutive hours? *A* Yes. On one instance such a flow continued for 45 consecutive hours.

Q Did the 34 days to which you have referred—

[*1528*] Mr. Branch: May I have the last answer?

Trial Examiner: The answer will be read by the reporter for the benefit of respondent's counsel.

(Whereupon the last answer as above recorded, was read by the reporter.)

By Mr. Wahrenbrock: *Q* Did the 34 days to which you have referred include all of the days on which such flow conditions persisted for two or more consecutive hours? *A* No.

Q How many days were there on which such flow conditions occurred for two or more consecutive hours? *A* 215.

Q How were those 34 days selected from the 215? *A* I selected them in order to illustrate such flow conditions for two or more consecutive hours occurring during different times of the day, varying durations of time, during different days of the week, during different months of the year and under varying load conditions.

Q How did you select the 21 days shown by your study from those 34 days? *A* In order that the final selection of days should illustrate flows of Massachusetts energy to all CL & P Company districts, which are supplied from the CP-1 and CP-2 lines, I selected those days from the 34 on which there was flow of [*1529*] Massachusetts energy both to the Winsted district of The Connecticut Light and Power Company and to Bristol and for further dates prior to July 1, 1939 to Middletown and Portland.

Q Does Exhibit 61 for Identification, to which you have referred in your testimony, correctly and accurately reflect the facts recorded in the log sheets, meter records and other data which you have described as the basis of your studies?

Mr. Branch: I assume, sir, that the question means for the particular times to which those things relate.

Trial Examiner: I think that can be understood in the asking of the question.

Mr. Wahrenbrock: Yes.

The Witness: It does.

By Mr. Wahrenbrock: *Q* In your study, did you discover any facts which would in any way indicate or suggest that the flows of electric energy from Massachusetts sources, to which you have testified, were accidental? *A* No.

Q That they were abnormal? *A* No. Permit me to state that the period of September 21, 1938 to October 2, 1938, was completely omitted from any consideration by me as being an emergency situation due to the hurricane disaster. None of the facts

to which I [*1530*] have testified refer to operations during this period.

Q In your study did you discover any facts which in any way indicate or suggest to you that the flows of electric energy from Massachusetts sources, to which you have testified, were extraordinary? *A* No.

Q Or that they were brought about unwittingly upon the part of any of the companies involved? *A* No.

Q Or that they were brought about in disregard or violation of established modes of operations or instructions? *A* No.

Mr. Branch: Well, I object to that. I don't think that he has shown that he had any basis on which to have sufficient information to answer that question. I don't think that the witness has been shown to be as yet informed as to the methods of operation or instruction.

* * * * * * [*1533*]

Trial Examiner: The Trial Examiner now rules that the portions of the stipulation offered by Mr. Wahrenbrock on July 9th, with the exception of the second sentence of paragraph 42, [*1534*] and with the exception of the second paragraph of Number 30, the offer of which was withdrawn by Commission counsel at the close of the original objection, will be received in evidence and an exception noted for the respondent.

* * * * * * [*1543*]

By Mr. Wahrenbrock: *Q* Mr. Miller, before continuing with the line of inquiry I was pursuing at the conclusion of the last session, I wish to refer you to the descriptions you have given of the several flow conditions which are illustrated by the respective flow diagrams in Exhibit 62 for Identification, and ask you to summarize, and if you desire, amplify your description of the flow diagrams. *A* Flow Diagrams A, C, E, G and I illustrate flow conditions—

Mr. Branch: Give me those numbers again.

A Flow Diagrams A, C, E, G and I illustrate flow conditions

when the C. P. lines received Massachusetts energy alone from the South Meadow substation. Flow Diagrams B, D, F, H and K, illustrate flow conditions on the C. P. lines when they received both Massachusetts and Connecticut energy from South Meadow Substation.

Mr. Wahrenbrock: May I interrupt? Pardon the interruption.

A The flow diagrams may be further classified as follows: Flow Diagrams A and B illustrate the flow conditions when the generation at Falls Village was zero. Flow Diagrams I—

Mr. Branch: Will you go slowly over this? I would like to take it down.

A (Continuing) Flow diagrams I and K—

[*1544*] Mr. Branch: A and B do what?

The Witness: Flow Diagrams A and B illustrate flow conditions when the generation at Falls Village was zero. Flow Diagrams I and K illustrate flow conditions when the generation at Falls Village was greater than zero but less than the Housatonic Division load. Flow Diagrams C and D illustrate flow conditions when the generation at Falls Village was greater than the Housatonic Division load but less than the combined deliveries to the Housatonic Division load and to Central Hudson Gas & Electric Corporation. Flow Diagrams E and F illustrate flow conditions when the generation at Falls Village was greater than the combined deliveries to the Housatonic Division load and to Central Hudson Gas & Electric Corporation but less than the combined deliveries to the Housatonic Division load, Central Hudson Gas & Electric Corporation and to Torrington. Flow Diagrams G and H illustrate the flow conditions when the generation at Falls Village was greater than the combined deliveries to the Housatonic Division, Central Hudson Gas & Electric Corporation and Torrington, but less than the combined deliveries to the Housatonic Division, Central Hudson Gas & Electric Corporation, Torrington and Bristol.

By Mr. Wahrenbrock: *Q* Have you any explanation to make of the relation of [*1545*] the Thomaston load to the summary of flow

conditions which you have just made? *A* The load in the Thomaston Division is small as compared to the loads to Bristol or Torrington, and I have not, in setting up the flow diagrams G and H, taken into account the matter of the Thomaston load; the effect of taking the Thomaston load into account might have led—I don't know if it would have occurred in any of the hours I have selected—but it might have resulted that in certain cases certain hours now illustrated by flow diagrams G and H might have been illustrated by flow diagrams E and F respectively.

Q In any case would—

Mr. Branch: May I have that last answer read?

Trial Examiner: The reporter will read the answer for the benefit of counsel.

(Answer read by reporter.)

Mr. Branch: Thank you.

The Witness: May I correct my statement I have just made? I think I made an error in my statement.

By Mr. Wahrenbrock: *Q* Would you like to have it read back to you? *A* Yes. Would you read that again? I think I have made a misstatement there.

Trial Examiner: The reporter will read back the witness's answer to him.

[*1546*] (The record is read.)

The Witness: I must correct that statement. It is not entirely right there. The only effect of taking into account the Thomaston load is that it would not have caused a change in the type of flow diagram from G and H to E and F. It might have resulted in showing, in the case of Flow Diagram G that the delivery to Bristol instead of being composed of energy from Falls Village and energy from Massachusetts to have been energy solely from Massachusetts, and in the case of Flow Diagram H, instead of showing a flow of Connecticut energy generated both in Falls Village and in Hartford and Massachusetts energy, it might have resulted in a showing that Bristol received Connecticut energy generated in Hartford, and Massachusetts energy.

By Mr. Wahrenbrock: *Q* Returning now to the line of inquiry we were pursuing at the conclusion of yesterday's session, I would like to ask you further whether in your study you discovered any facts which would in any way indicate or suggest that the flows of electric energy from Massachusetts sources, to which you have testified, were due to any negligence of any employee of any of the companies involved? *A* No.

Q Did any of the log sheets or other records of the company which you inspected contain any notation indicating [*1547*] that any of the flows of electric energy from Massachusetts sources to which you have testified, were due to a violation by any employee of any of the companies of any instructions issued to him or governing his actions?

Mr. Branch: I object because it does not appear that the witness knows, and I should think it would be almost impossible that he would know what the instructions to employees over a long period of time, which probably varied from time to time, were.

Mr. Wahrenbrock: That is not involved in the question, if the Examiner please. It is merely a question of whether the data he has examined, including the log sheets, show that any of the conditions on which these flows were based, arose out of any violation of orders or instructions.

Trial Examiner: I think he can answer as to what the log sheets show. He has examined those. However, I may say this: I think you are entitled to know what log sheets and of what companies you are talking about.

Mr. Wahrenbrock: He has described the data that he has examined with considerable particularity, Mr. Examiner.

Trial Examiner: You referred to this other company, and I didn't know whether there was one or more companies referred to.

Mr. Wahrenbrock: I would be glad to limit the questions to those log sheets and data which he has examined, as described in [*1548*] his testimony.

Mr. Branch: I object to the question for the reasons specified.

Trial Examiner: I think you might separately ask the different

questions. I can't follow the objection of counsel, however. It seems to me this description of the log sheets was made in yesterday's hearings, and I think it will refresh the memories of all if the witness will state which company's log sheets he is talking about.

Mr. Branch: Excuse me. I didn't quite understand what you said about my objection, sir.

Trial Examiner: I said that I could not see the merit of it and am obliged to overrule your objection.

Mr. Branch: All right.

Trial Examiner: Exception will be noted.

Mr. Branch: I understand your statement, though I do not wish to be understood as agreeing with you.

Trial Examiner: All right.

[1549] By Mr. Wahrenbrock: *Q* In making your answer, will you refer to the data specifically? *A* As I have stated previously, I made use of the Connecticut Valley Power Exchange log sheets. I did not observe on any of those log sheets any notations indicating that operations were due by reason of a violation of any rules by any employees of the companies involved in the Exchange. I did not observe on the Housatonic division log sheets any remarks or notes indicating that such a violation of rules by an employee had occurred. The information as to the delivery of energy from Torrington to Winsted and a generation at Robertsville was supplied to the Commission by The Connecticut Light and Power Company, and no notation was supplied with that information indicating any violation of any rules of operation by any employee. The Torrington R. A. charts and the Torrington printometer did not indicate—did not have any notation indicating any violation of such rules, except that for one month, the R. A. charts of The Connecticut Power Company, showing the delivery of energy demand at Torrington, had been misplaced twelve hours in setting it up. The charts they had set up showed twelve hours incorrectly, and a notation was placed by The Connecticut Power Company informing us that the charts were set up twelve hours wrong, and indicating the proper way to read those charts.

[*1550*] *Q* That last error, when corrected didn't affect the validity of any of the conclusions that you have read? *A* It did not affect any conclusions because the proper use of the charts as indicated by the note precluded that.

Q May I ask if you have photostatic copies of the Falls Village log sheets that you can show me? *A* I believe they are on counsel's desk.

Q Do the log sheets of the Falls Village plant of The Connecticut Power Company contain a space for each hour in which you have found notations of irregular conditions? *A* I would not say that the Housatonic log sheets contain the space specifically reserved for each hour. They have a space running the length—from the top to the bottom of the log sheet, in which the operator and other employees at Falls Village apparently place all notes regarding operations of the Housatonic division, and indicating the connections of the various loads on the CP lines, and that space is ample to provide all the information on operations, and on some days that space is completely filled with notes showing that every irregularity of operation that might occur would have been stated there, because every time a switch is operated, it is noted in that column. So that, they have a complete story as to the switching operations along the CP lines and at Falls Village.

[*1551*] *Q* In your study, did you attempt to discover any facts to indicate that the operating personnel of The Connecticut Power Company or The Connecticut Light and Power Company knew that the Connecticut loads were being supplied by Massachusetts sources of energy?

Mr. Branch: I object as to what The Connecticut Power employees knew, or any indication of what anybody else knew, unless the authority and source of information respecting The Connecticut Power Company is shown.

Mr. Wahrenbrock: I will modify the question to confine it to employees of The Connecticut Light and Power Company.

Mr. Branch: I think you have to have something more definite than that.

Trial Examiner: Will you read the question back?

(Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: Is this a part of a series of questions to develop something, or is it to stand alone?

Mr. Wahrenbrock: I have one or two further questions on the same subject.

Trial Examiner: Well, this doesn't appear very material. It may be relevant, and the objection will be overruled and the answer permitted.

By Mr. Wahrenbrock: *Q* Will you limit your answer to the operating per- [*1552*] sonnel of The Connecticut Light and Power Company, please. *A* Will you read the question again, please.

(Whereupon the last question as above recorded was again read by the reporter.)

Trial Examiner: You understand, Mr. Miller, that you will answer only as to The Connecticut Light and Power Company?

The Witness: Yes, sir. No, except as the facts which my study elucidated, must undoubtedly have been known by the operating personnel, and the conclusions to be drawn from them must have been understood by them.

Mr. Branch: I move that the responsive part of the answer, "No", stand, and that the rest be stricken.

Trial Examiner: It will be so ordered.

* * * * * * [*1556*]

Mr. Wahrenbrock: *Q* From what source has the Borough of Groton received its electric energy supply during the period covered by your study? *A* The Borough of Groton has purchased all its electric energy requirements from The Connecticut Light and Power Company which owns and operates a transmission line from its Montville plant to the Borough of Groton.

Q Will you state the amount of purchases made by the Borough of Groton from The Connecticut Light and Power Company during the years covered by your study? *A* The Borough of Groton purchased 3,684,203 kilowatt hours in the year 1935. 4,233,520 kilowatt hours in the year 1936.

Trial Examiner: Was that 524?

The Witness: 520.

4,300,560 kilowatt hours in the year 1937.

4,664,380 kilowatt hours in the year 1938.

5,554,744 kilowatt hours in the year 1939.

And 6,234,240 kilowatt hours in the year 1940.

* * * * * * [*1557*]

By Mr. Wahrenbrock: *Q* At what point or points was the energy supplied by The Connecticut Light and Power Company to the Borough of Groton delivered from August 26, 1935, to February 28, 1941.

* * * * * * [*1559*]

A The energy sold by The Connecticut Light and Power Company to the Borough of Groton was delivered at the Trails Corner substation in Groton and at the Groton-Long Point high voltage substation in Groton-Long Point.

Mr. Branch: May I have that answer read?

Trial Examiner: The reporter will read the answer for the benefit of respondent's counsel.

(The answer is read by the reporter.)

By Mr. Wahrenbrock: *Q* What did the data which you have studied and described in your testimony show about the point of generation of that energy? *A* I did not make any attempt to determine the source [*1560*] of the energy delivered to the Borough of Groton, but it would appear from the map of The Connecticut Light and Power Company that all or the greater part of the energy delivered to Groton was generated at The Connecticut Light and Power Company's 50,000 k. v. steam electric plant at Montville, in Connecticut.

Q Was all the electric energy purchased by the Borough of of Groton consumed at points in the State of Connecticut? *A* No. The Borough of Groton sold part of the electric energy which it purchased from the Connecticut Light and Power Company to

Fishers Island Farms, Incorporated, and its successor, Fishers Island Electric Corporation, for resale. During the period commencing prior to the passage of the Federal Power Act up to approximately February 8th or 9th, 1941, when such sales were discontinued.

Q Will you state the amounts of purchases of electric energy by Fishers Island Farms, Incorporated, from the Borough of Groton during the period of your study? *A* Fishers Island Farms, Incorporated purchased from the Borough of Groton 1,280,700 kilowatt-hours in the year 1935, 1,348,200 kilowatt-hours in the year 1936, 1,409,150 kilowatt-hours in the year 1938, 1,435,600 kilowatt-hours in the year 1939 and up to November 17, 1940, 1,396,800 kilowatt-hours in the year 1940.

[*1561*] *Q* What was the source—

Mr. Branch: May we have the 1939 figure?

The Witness: 1,435,600.

By Mr. Wahrenbrock: *Q* What was the source of those figures? I mean to say where did you obtain that data? *A* The figures for 1940 and 1938 were obtained from Form 64-A, filed by Fishers Island Farms. The figures for the year 1939 were obtained from the records of the Borough of Groton in the course of a field trip that I made. I believe the figures for 1935 and '36 were obtained at the same time.

Q Have you figures for the year 1937? *A* No, I did not request those figures and the Fishers Island farms did not file a report for the year 1937. Neither did the Borough of Groton in its report to the Commission, state the amount of its sales to Fishers Island Farms.

Q Have you any figures on the purchases by the Fishers Island Electric Corporation since November 17th, 1940? *A* No, I was not able to locate a report or a power system statement for the Fishers Island Electric Corporation for the balance of 1940, and the report for 1941, of course, is not due as yet.

Q In your discussion of the three two-winding power trans-

formers at South Meadow substation of The Connecticut Power Company, I believe you stated the capacity of those transformers. [*1562*] Will you explain under what conditions of rating you stated the capacity of those transformers? *A* Under the condition of forced-cooling. The rating of one transformer is 19,200 k. v. under forced cooling, and 12,000 k. v. a. without forced cooling. The ratings of the other two transformers are each 12,000 k. v. a. under forced cooling and 7,500 k. v. a. without forced cooling.

Trial Examiner: Did I understand you to say "forced cooling"?

The Witness: Yes.

By Mr. Wahrenbrock: *Q* Will you explain briefly for the benefit of your lay audience what forced cooling is? *A* It is simpler to start first without forced cooling in the explanation. The transformers are connected up and used without any attempt to take the heat developed in the transformers, other than natural convection currents that may exist and radiation from the transformers. Under those conditions the transformers will have a certain rating. Now, if some means is provided for removing heat faster than would be possible under conditions where no attempt was made to cool the transformers, the transformers are capable of operating under considerably heavier loads, without excessive heat causing damage to the transformers.

[*1563*] Mr. Wahrenbrock: Thank you.

By Mr. Wahrenbrock: *Q* In your testimony yesterday you referred briefly to an instance of a flow of Massachusetts energy to all points on the C.P. 1 and C.P. 2 lines for forty-five consecutive hours. Will you state the dates on which the flow that you referred to occurred? *A* On July 4th and July 5th, 1937. The deliveries to Central Hudson Gas & Electric Corporation exceeded the Falls Village generation during each hour of the twenty-four hours of July 4th, 1937 and during each hour of the next twenty-one hours of July 5th, 1937, finishing with the hour ending 9 P.M. on July 5th, 1937.

Q During those forty-five hours, were all the loads supplied by the C.P. 1 and C.P. 2 lines supplied exclusively by Massachusetts energy?

Mr. Branch: I have an objection that goes to this general line of testimony, which I think I made before, and of course it applies to this question and similar questions.

Trial Examiner: The objection is overruled. It seems to me this is obviously relevant.

Mr. Branch: I wasn't attempting to reargue it, sir, I merely wanted it to be understood that my objection goes to each of these questions, so I won't have to interrupt on each one of them.

[*1564*] Trial Examiner: It will be understood that the objection goes to the entire line of questions. I believe the witness has a question before him.

Mr. Wahrenbrock: I wish to rephrase that question, if I may.

By Mr. Wahrenbrock: *Q* I ask you whether during that 45 hours all of the electric energy delivered by The Connecticut Power Company from its C.P. 1 and C.P. 2 lines consisted exclusively of Massachusetts energy. *A* No, I believe there were one of two hours, or possibly three hours, in those 45 hours, when the energy delivered to the C.P. lines and to the loads on the C.P. lines included some Hartford energy, in addition to Massachusetts energy, but in each of those cases where there was some Hartford energy, the Massachusetts energy was much the larger.

Q In making that answer, are you relying on your recollection or do you have the data available from which you can refresh your recollection? *A* I am at the present moment relying on my recollection, but on the counsel table there is a group of photostats of Connecticut Valley Power Exchange log sheets.

Q Can you refresh your recollection by referring to the log sheets?

* * * * * * [*1566*]

By Mr. Wahrenbrock: *Q* I show the photostats to the witness to enable him to refresh his recollection with respect to the 45-

hour consecutive flow to which he has testified. *A* I find—shall I answer the question?

Trial Examiner: You may answer the question.

A I find on referring to The Connecticut Valley Power Exchange load control supervisor's log sheet, that there were five hours during the 45-hours of consecutive flow of Massachusetts energy to all points on the CP lines during which, as indicated by meters at South Meadow, energy from the Hartford Electric Light system was also transmitted—I will correct that. There were six hours in those 45 hours during which energy from the Hartford Electric Light system was transmitted to the CP 1 and CP 2 lines.

Q During the other 39 hours, was Massachusetts energy exclusively delivered at all points from the CP-1 and CP-2 lines? *A* The meter readings indicate that to be so.

Q In your examination of the log sheets, did you find [*1567*] instances in which generation of energy, of electric energy in Connecticut, was shown to have been stopped in order to permit Connecticut loads to be carried by generators in Massachusetts? *A* I have seen in the Housatonic division log sheets a reference to shutting down Falls Village in order to let Cabot station carry full loads. I have also seen a reference to the shutting down of the Falls Village for a test run on Cobble Mountain station.

Q What did shutting down Falls Village mean? *A* It meant the cessation of generation at the Falls Village plant.

Q And what did letting Cabot carry—what was the reference to Cabot? What did that mean? *A* It means that Cabot station would be allowed to generate more energy than it would generate if the Falls Village were operating.

Q What is Cabot? *A* The Cabot plant, I believe, is a plant of the Turners Falls Power and Electric Company in Massachusetts.

Q And what is Cobble Mountain? *A* Cobble Mountain is also a plant in Massachusetts, one of the Western Massachusetts Companies system.

Q From the study you have made are you able to say whether

the 321 days to which you referred in your testimony as being days on which you found Massachusetts energy being delivered [1568] to the CP 1 ad CP 2 lines, are you able to say whether those 321 days were the only days in the period covered by your study, or which Massachusetts energy was delivered to The Connecticut Light and Power Company at one or more of the following points, that is, at Portland, for its East Hampton division, at Bristol for its Bristol division, or at Torrington through The Torrington Electric Light Company for its Winsted division?

Mr. Branch: I object. I think that contains several assumptions of which there is no evidence. I think the question assumes that on all of these days there was Massachusetts energy delivered to our plant. I don't understand there is any evidence as to that. There was evidence, I think, that he picked out days in which Massachusetts energy was received at South Meadow, and possibly there was some relation to what Falls Village was doing on that day. But I don't think that the witness testified that on these days Massachusetts energy was going to our loads.

Trial Examiner: I think it has been so testified, Mr. Branch. It is at least a part of a chain of proof, and perhaps the question may be a little leading. I think if it were worded otherwise—

Mr. Branch: I will object to it in that form.

Mr. Wahrenbrock: I will ask one or two preliminary questions, if I may.

By Mr. Wahrenbrock: [1569] *Q* Will you, to refresh your recollection, tell us the flow conditions for which you selected the 321 days? *A* May I have the question so I can answer it correctly?

Trial Examiner: The reporter will read the question for the benefit of the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

A The days were selected as having hours when the generation at Falls Village was zero, or less than the delivery to Central Hudson Gas & Electric Corporation, simultaneously with the receipt of South Meadow of energy from Massachusetts.

Mr. Branch: May I have that answer read?

(Whereupon the last answer as above recorded, was read by the reporter.)

By Mr. Wahrenbrock: *Q* In that selection, did you take into account the load of the Housatonic division? *A* I did not. Could I amplify my answer?

Trial Examiner: What is that?

The Witness: I would like to amplify my answer. I haven't quite stated—

Trial Examiner: You may complete your answer, if you wish to.

The Witness: In my study of the log sheets of the [*1570*] Connecticut Valley Power Exchange, I noted days, and I think I have stated that previously, when the generation at Falls Village was zero, or small, in the order of approximately a thousand kilowatts or less, and I also noted days having hours when the generation at Falls Village was less than the delivery to the Central Hudson Gas & Electric Corporation, or slightly more than the delivery to the Central Hudson Gas & Electric Corporation. In the selection of the 321 days, I made use of only those days having hours when Falls Village generation was zero, or the Falls Village generation was less than deliveries to the Central Hudson Gas & Electric Corporation.

By Mr. Wahrenbrock: *Q* Under such flow conditions, would Massachusetts energy be delivered to some one or more of the delivery points at which The Connecticut Light and Power Company was supplied with electric energy from the CP 1 and CP 2 lines?

Mr. Branch: I would like to know whether by that question you mean to include Hartford itself?

Mr. Wahrenbrock: I don't understand the question.

Trial Examiner: He is asking whether you mean whether it is delivered to Hartford.

Mr. Wahrenbrock: I don't know that the record showed The Connecticut Light and Power Company had any delivery at Hartford.

Mr. Branch: I believe there was a contract by which they did, yes, sell to Hartford.

[*1571*] Trial Examiner: Are you talking about selling to Hartford or taking deliveries from Hartford? I don't think counsel understand each other on that.

Mr. Branch: Excuse me. I meant Connecticut Power Company. My associates said Connecticut Light and Power, but I understood the question is whether these conditions would establish the fact that some of the load that was served by Connecticut Power Company must have received Massachusetts energy, and I wanted the question clarified to make sure whether they included Hartford.

Mr. Wahrenbrock: I think if the question is read counsel will see that it is not as he thought.

Trial Examiner: The reporter will read the question back.

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Branch: My point about Hartford is obviously mistaken. I didn't get the "Light and Power".

Trial Examiner: The witness may answer the question.

A Yes, I noted that during many of the hours when the Falls Village generation was shown to be only either very small, as I have explained, or slightly larger than the deliveries to Central Hudson Gas & Electric Corporation, the delivery to Bristol, as shown on the log sheet, was greater than either the amount of Falls Village generation in one case or the difference between the Falls Village generation and the [*1572*] deliveries to the Central Hudson Gas & Electric Corporation in the other case, indicating, therefore, that Bristol, and therefore Middletown and Portland could not have been supplied from the Falls Village generation and must have been supplied from South Meadow substation, which was simultaneously receiving energy from Massachusetts.

By Mr. Wahrenbrock: *Q* Now, were those 321 days the only days when the Connecticut Light and Power Company would be receiving at Portland through the Middletown Division of The

Connecticut Power Company, or at Bristol from The Connecticut Power Company, or at Torrington, through The Torrington Electric Light Company from The Connecticut Power Company, energy which included or consisted exclusively of Massachusetts energy? *A* No, my explanation that I have just given clearly shows that there are many other days when those points were receiving in whole or in part Massachusetts energy.

Q Other than the 321— *A* Other than the—

Mr. Branch: I object to that general statement "many other days" and ask that it be stricken out on the ground that more definite information should be applied, if the matter is to be opened up at all.

Trial Examiner: I don't think the statement "many other days" is objectionable. I think that may be clarified by [*1573*] counsel for the respondent on cross examination, if you wish. However, I would like to have that question read back. There is another point in there which I rather question the clarity of. Will you read the question for the benefit of the Trial Examiner?

(Question read by reporter.)

Mr. Branch: I ask that the answer be stricken.

Trial Examiner: The motion is overruled. The answer will remain on the record. However, I would ask the witness to clarify that point.

The Witness: I stated in my explanation of the previous question that I noted from an examination of the Connecticut Valley Power Exchange log sheets that during some hours the Falls Village generation was small, of about the order of 1,000 k. w. and that during many of those hours I also noted that Bristol received more energy than was being generated at Falls Village. This made it apparent that Falls Village could not have supplied the delivery to Bristol, and therefore energy from South Meadow must have been delivered, at least in part, to Bristol, and if those same hours South Meadow was receiving Massachusetts energy, then Bristol must have been receiving at least in part Massachu-

setts energy, and if Bristol was receiving Massachusetts energy Middletown and Portland must have been receiving Massachusetts energy. I also stated that I noted hours when the Falls Village [*1574*] generation exceeded by a small amount the deliveries to Central Hudson Gas & Electric Corporation, and during many of those hours I noted that Bristol received more than the difference between the generation at Falls Village and the deliveries to Central Hudson Gas & Electric Corporation. It is therefore evident that Bristol could not have been supplied entirely from Falls Village generation, and therefore Bristol must have received energy from South Meadow and if Bristol received energy from South Meadow, Middletown and Portland received energy from South Meadow and the energy at South Meadow during those hours was in whole or in part energy received from Massachusetts, and therefore, it is evident that Bristol and Portland both received during those hours energy from Massachusetts.

Trial Examiner: I think the witness has stated his point and explained what I wanted to know.

By Mr. Wahrenbrock: *Q* And that last category of instances was one outside the 321 days you included in your selection? *A* That is correct.

Trial Examiner: The words of the witness's answer to my question, beginning with "And therefore" may be stricken from the record, as being beyond responsiveness to the question.

Mr. Wahrenbrock: I am sorry, I don't understand that.

Trial Examiner: He again stated his conclusion, in answer [*1575*] to my question, which had nothing to do with the conclusion, but I wanted to know what his former testimony was, to which he referred as the background of his answer to your previous question. To that extent it was not responsive to my question, and I asked that it be stricken from the record.

Mr. Wahrenbrock: I would like to know what the portion being stricken is. I am not clear in my mind.

Trial Examiner: Will you read that portion for the benefit of counsel?

(The record is read by the reporter.)

Trial Examiner: That is the portion of his answer to my question.

Mr. Wahrenbrock: Mr. Examiner, I think that the portion which you suggest striking is relevant and material.

Trial Examiner: I think it has already been testified. I simply asked him upon what he based his answer. He referred to previous testimony. I think it is a repetition of his conclusion. He is basing his statement upon a certain set of facts, and not upon his own conclusion. I would suggest that counsel look at the transcript during the noon hour and he may understand more fully then the purpose of the correction made.

Mr. Wahrenbrock: I will do that. I am a little bit disturbed that it should be there. I would like to have an opportunity to get it into the record if on study it appears to me that it should be there. [*1576*] I would like to ask the witness this question, to clear up an omission, I believe.

By Mr. Wahrenbrock: *Q* What was the generating capacity of the Leesville plant which was destroyed in the hurricane and the flood of 1938? *A* 390 k. w.

Q What were the average monthly maximum demands and the annual monthly demands of the purchases of the East Hampton District of The Connecticut Light and Power Company from The Connecticut Power Company at Portland, during the years 1937, 1938 and the first six months of 1939?

Mr. Branch: May we have that question read?

Trial Examiner. The question will be read for the benefit of respondent's counsel.

(Question read by reporter.)

A The average monthly maximum demands for the years 1937, 1938 and the first six months of 1939 were 842.6 k. w., 1,017.2 k. w., 1,065.6 k. w., respectively. The annual maximum demands for the years 1937; and 1938, were 1,176 k. w. and 1,324.8 k. w., respectively. The highest maximum demand during the first six

months of 1939 was 1,200 k. w. The demand in each case was a 30 minute integrated demand.

Q Are you able to state the capacity of the industrial [*1577*] plant to which you referred in the East Hampton District of The Connecticut Light and Power Company? I believe it was referred to as the Brownell Company plant, as requested by the Examiner yesterday. *A* No. Since that question was asked by the Examiner, I have made unsuccessful efforts to secure the information. I would like an opportunity to investigate further and to testify to this matter at a later time during the hearing.

Mr. Wahrenbrock: If that can be arranged, Mr. Examiner, I should like to have an opportunity to recall Mr. Miller on that point for further direct examination, later.

Mr. Branch: I think we can spare you that effort. I am willing to stipulate that it was negligible.

* * * * * * [*1581*]

PERCY H. THOMAS,

a witness called on behalf of the Federal Power Commission, being first duly sworn, testified, as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Will you state your name and residence. *A* Percy H. Thomas, 38 Palisade Road, Atlanta, Georgia.

Q What is your position with the Federal Power Commission? *A* I am at present the regional director of the second administrative district of the Federal Power Commission, headquarters at Atlanta.

Q What is your profession? *A*. Engineer.

Q Will you please describe your training and experience as an engineer in a general way. *A* Technical education at the Massachusetts Institute of Technology, Boston, Massachusetts; degree of B.S. in electrical engineering. First ten years with Westinghouse Electric & Manufacturing Company, Pittsburgh and East Pittsburgh, Pennsylvania. First few months of this period as an

apprentice, later in charge of inspection of defective transformers returned from service. Later, in charge of development and design of [*1582*] lightning protective apparatus applied to power systems. My experience with this company involved laboratory and research work, much of which related to transformers. My duties involved many inspections of power transformers, breaking down in service, a frequent occurrence in the early days of electric utilities. I remember one three-months' trip to the Pacific Coast extending from Los Angeles to Seattle, and another of the same length in Utah and Montana, making investigations of the effects of lighting and similar disturbances on the high tension lines and transformers of certain electric utilities operating in those regions.

Q Did I understand you to say of "some length" or "the same length"? *A* Of the same length. During this period I presented two important papers, based partly on this work, before the American Institute of Electrical Engineers: one on static strains in electric circuits at a meeting held at Columbia University in New York, in 1902; and the other on the results of my investigations, at a meeting in Asheville, North Carolina, held in 1904. These are published in the transactions of the Institute for these years. May I ask if I am speaking loud enough?

Trial Examiner: You are for my benefit. I don't know about counsel. Will counsel state whether he is able to hear [*1583*] the witness?

Mr. Branch: Yes, sir, we are able to hear, as long as our friend, Mr. Thomas, is not competing with the locomotives.

The Witness: During this ten years, the art of high tension transmission, and of course the power transformer, made great strides, and I was fortunate enough to be intimately connected with it by my connection with the Westinghouse Company which took the leading part in that work.

For the next four years I was the chief electrician of the Cooper Hewitt Electric Company, which was a personal enterprise of George Westinghouse, undertaken to develop the famous mercury vapor vacuum invention of Peter Cooper Hewitt.

I had charge of a research laboratory developing various practical applications, and of the design of commercial apparatus. While at that time the operations were not on a large scale, the types of tube lamps and mercury arc rectifiers that have developed from these types are now very widely used. I may point out that such mercury arc rectifiers serve to change alternating current to direct current, and that that application made use of power transformers. This service involves specially exacting requirements and special designs of transformers are appropriate.

In 1907, I became an independent consulting engineer with offices in New York City, and for four years I had a partner with an office in Boston. During this general period I devoted [*1584*] much time to the interests of the American Institute of Electrical Engineers. In 1913 and 1914, I designed the 110 k.v. transmission line by the well known mining and reduction company of the Chile Copper Company, located at Chuquicamata near Calama, Chile. This was an enterprise of the firm of Guggenheim Brothers, the first installation having capacity for the handling of 10,000 tons of ore a day, and an equal amount of waste.

In 1916, this firm of Guggenheim Brothers set up a large engineering and construction organization for the purpose of enlarging the mine at Chuquicamata to four times the size, and to make several other important mining installations in South America. I was consulting electrical engineer in this organization, in charge of the power department, with headquarters in New York City. Several high tension lines were included in the installations which we designed.

In 1923, the installations being completed, the firm of Guggenheim Brothers disposed of these plants to others, and disbanded their engineering organization. These plants are now in highly successful operation. I will add that during a relatively slack period, my department with Guggenheim Brothers was commissioned to design a 30,000 horsepower hydroplant at Maitenes, Chile, including a 110 k.v. transmission line, the whole constitut-

ing an important addition to the then English owned utility system [*1585*] supplying the capital of Chile, the City of Santiago; also the transmission and transformer system installed at that time in connection with the electrification of the main lines of the Government railroads, connecting Santiago and Valpariso, some 150 miles apart. Both of these installations are still in service, and have been greatly extended.

I was one of the two representatives of the American Institute of Electrical Engineers appointed to the joint committee on overhead and underground crossings of power circuits over other circuits. I believe that title is not literally correct, but it is very close. This committee organized a number of years ago to make rules covering crossings and joint line constructions for various types of electric lines, included representatives of the American Institute of Electrical Engineers, of the American Telephone & Telegraph Company, of the National Electric Light Association, and of the American Railway Association. It was the first national body to draw rules for such crossings.

I made a trip to Brazil in 1929 for the Canadian and General Finance Organization, Toronto, Canada, to make reports on a number of the important problems involving the design and performance of their 132 k.v. lines, the practicability of interconnecting the cities of Rio de Janiero and San Paulo, 350 miles apart, with electrical circuits, and in general, to advise on the best methods of remodeling their distribution and transmission [*1586*] arrangements in Rio de Janiero itself.

I was a member of the Pan American scientific Congress about 1915, presenting a paper on the then present state of electric power system development.

During the participation of the United States in the first World War, I was consultant to Frederick Darlington, chief of the power section of the War Industries Board. This was a part-time work.

In 1923, I resumed my position as an independent consulting engineer, and which work I continued until 1934, when I joined

the staff of the National Power Survey, set up by the Federal Power Commission.

In 1924, to 1926, I made two extensive studies of the possible economies through interconnections of electric utilities in areas by high tension transmission lines; a paper on the first of these studies was presented by invitation before the American Institute of Electrical Engineers at a convention at Birmingham, Alabama, in 1924. It was entitled, "New type of high tension network", and was published in the transactions of the society for that year.

The other involved a year's work for a group of the leading electric utilities in New England and Eastern New York, including the then New York Edison Company. While this involved transmissions and economies of interconnections on a large scale, it was for the confidential information of that group [*1587*] and was never published. I have referred to the doing of this particular work only as a part of my statement of experience.

I have made numerous studies of important prospective transmission lines and power plants. I mean, enterprises that were never carried out. These included a transmission system for providing electric power to mining and other enterprises in the high country of Bolivia, the transmission lines from the Volcan River in Uruquay to Montevideo, and a special design for the line from Boulder Dam to Los Angeles, as also one for the high tension lines of the Metropolitan Water District of Southern California. I have taken a great interest in the activities of the American Institute of Electrical Engineers, and those of the American Society of Mechanical Engineers. I am a Fellow of the former and a full member of the latter. I have served on many committees of both societies, especially for the American Institute of Electrical Engineers, and was elected for a term each—

Trial Examiner: If you will suspend for just a moment.

(This was because of the noise caused by a passing train.)

Trial Examiner: Suppose you start back three sentences.

The Witness: I am a Fellow of the former and a full member

of the latter. I have served on many committees of both societies, especially for the American Institute of Electrical [*1588*] Engineers and was elected for a term each as manager and vice-president therein.

This society has a standing committee known as the Committee on Power Transmission and Distribution. I have served several terms as chairman of this committee. The duties of this committee include the passing upon papers offered to the Institute, bearing on electrical transmission and distribution subjects, and the general forwarding of the interests of engineers in this branch of the electrical art.

I presented many papers before technical societies, and have written many articles for the technical press in my 40 years' experience as an electrical engineer. A number of these related to electric transmission and transformers.

I am a patentee of a considerable number of United States Patents in electrical subjects, including power transmission.

I have testified in the courts often on electrical subjects. Perhaps that will be sufficient.

By Mr. Wahrenbrock: *Q* Were you present at this hearing through the entire time Mr. Harold Miller was on the stand? *A* Yes.

Q Did you hear all of his testimony? *A*. I did.

Q Are you familiar with the table which is Exhibit 61 for Identification, and diagrams which are together as Exhibit [*1589*] 62 for Identification? *A* Yes.

Q Have you studied and familiarized yourself with the methods used by Mr. Miller in his study and in the statements he has made in his testimony? *A* Yes.

Q Do you understand the principles on which that study was based? *A* I do.

Q Have you made a study of the facilities by means of which electric energy from Massachusetts was supplied to the Winsted and Bristol districts, and prior to July 1, 1939, to the East Hamp-

ton District of The Connecticut Light and Power Company in Connecticut as shown by Mr. Miller's testimony? *A* I have.

Q Will you please describe the study you have made? *A* I have examined the maps of the circuits as furnished to the Federal Power Commission by the various companies involved, have looked over many of the log sheets, and have personally visited most of the stations and many of the lines involved which are located in Connecticut. I have examined the data to satisfy myself as to the flow of energy in the circuits at various times, places, and under different conditions. I will add that I have had a reasonably good knowledge of the systems of this territory for many years.

[*1590*] *Q* Directing your attention to the instances of flows of electric energy from Massachusetts to points in Connecticut as shown by Mr. Miller's study, and particularly to those instances in which the electric energy requirements of the Winsted and Bristol districts, and prior to July 1, 1939, to the East Hampton district of The Connecticut Light and Power Company, were supplied solely by electric energy from Massachusetts, except that a part of the Winsted requirements may also have been supplied from the Robertsville plant of The Connecticut Light and Power Company, will you please state what the primary principle is which underlies the statement that those loads were supplied from Massachusetts?

Mr. Branch: Well, I object to that. It is assuming a great deal that this witness hasn't testified to, and I think it is immaterial, or until something further is shown.

Trial Examiner: Read the question back.

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Branch: I think that is an improper way to try to get the evidence in, in addition to my other objection.

Trial Examiner: The witness has testified he heard all of the testimony of the other witness, and that he made a study of the

record itself. The objection is overruled. The witness may answer the question.

[*1591*] *A* In answering your question, it is necessary to explain what is involved in supplying a load to an electric utility's system. Supplying a load, as it is expressed in general parlance, means the doing of work in a physical sense.

Technically speaking, work is the overcoming of a resistance through some definite distance, that is, to do work it is necessary to apply a force equal to or superior to the resistance to be overcome, and to cause that force to continue until the resistance is overcome through the whole prescribed distance.

The amount of work is then quantitatively equal to the product of the amount of the resistance overcome by the distance over which the resistance is overcome. In lifting a weight of 100 pounds 2 feet, the work done is 200 foot-pounds. The load in an electric utility system is made up of various appliances, motors, lights, heaters and so forth, in the operation of each of which a certain amount of work is performed and an equivalent amount of energy is required. The aggregate of these amounts of energy is the load on the system.

Work is of the nature of resistance and is something that must be overcome. That something that overcomes resistance and does work is energy. Energy is an entity and it can neither be created or destroyed. Like the conservation of matter, the [*1592*] doctrine of the conservation of energy is universally recognized. It is to the effect that there is in the universe now existing a definite amount of energy which can neither be increased nor decreased. To do useful work energy is required and this energy must be obtained from some existing stored supply.

Many of the sources of stored energy in nature are well known. For example, the coal pile in the steam plant or the water stored in a hydro plant reservoir represents stored energy. So do the elements of a charged storage battery. One of the simplest forms of stored energy is the compressed spring, ready to run a toy train. Energy is stored in every magnetized magnet core. It is

the main purpose of an electric utility to secure stored energy for its distribution operations from the most advantageous source and to make it available on demand at the premises of ultimate consumers, to do work there.

Historically speaking, general distribution of power by the utilization of various means has been proposed, as for example, by compressed air, a long cable drive, or by water or oil in pipes under pressure. In its present state of development, however, the electric circuit offers a flexibility and an efficiency in the distribution of energy far beyond any imagination of our great grandfathers. The energy released from its stored supply by the electric [*1593*] utility system in getting to the ultimate consumer makes use of many carriers in reaching that consumer.

For example, the hot molecules of gas in the flame of the boiler furnace, the heated molecules of iron in the walls of the boiler tubes, the vibrating molecules of water in the steam, the high-velocity steam jet in the turbine, the mechanical torque in the rotor of the generator, the electrical reactions in the circuit connecting the generator with the load, including transmission lines, distribution lines and transformers.

In the case of the hydro-generator, the stored energy of the water in the reservoir is carried by the water-jets in the turbine in the torque on the water-wheel shaft through the generator to the electric circuit. There is, of course, a certain dispersion of energy largely in the form of heat-losses in each of the carriers, but the adaptability of the laws of nature is such as to make possible a highly satisfactory overall efficiency.

I may point out that the adjectives "electrical", "magnetic", "kinetic" and so forth may be used with the word "energy" to indicate with what character of carrier, by what means of measurement, by what type of storage, the energy is associated.

Since energy can neither be created or destroyed, this whole operation may be set up as a bookkeeping problem. The system is debited with a certain amount of energy at the power [*1594*] plant, and this must then be entirely accounted for; starting at

the coal pile a portion is lost by the well-known dispersion of energy in heat and otherwise in the various stages as the energy is passed along.

A part is dissipated as heat in the transmission-line losses, a part in transformer losses, a part is used for lighting and various facilities in the power houses, and substations for the utility's own use, and finally, the balance is divided among the various ultimate consumers.

Energy may be likened to credit in a bank. Each is an indestructible entity with only one characteristic: With energy, the power to do work; with credit, the power to buy.

The holder can draw his credit in one-dollar bills or ten-dollar bills or in double-eagles. He can deposit pennies or thousand-dollar bills. The bank account knows only the aggregate amounts. Energy may be carried in an electric circuit or by mechanical or electrical means and may be finally delivered at the same point, and when once delivered, all traces of the means of conveyance is lost.

Or energy may be withdrawn from a stored supply by any of these means and no way of telling by what means it travelled is shown, from any characteristic of the received energy.

With this explanation I now turn to the specific instances of the flows of electric energy from Massachusetts to points in [*1595*] Winsted, Torrington and East Hampton, as inquired of in your question.

In view of the doctrine of conservation of energy, there can be no energy created in the system. Since none is supplied by any of the generators located in Connecticut, it follows that the energy supplied to the loads at Winsted, Bristol and East Hampton, must come from Massachusetts.

Q As a matter of common and accepted engineering practice, can the flow of electric energy between a source of supply and a load be detected? *A* Yes. That is regularly done in service.

Q How? *A* By suitable instruments.

Q What is a common type of such instrument? *A* The electrical watt-meter.

Q Can the direction of flow of electric energy between sources of supply and loads be ascertained? *A* Yes.

Q How is that done? *A* By suitable instruments.

Q And what is a common type of such instrument? *A* The electrical watt-meter.

Q Can the rate of flow and the amount supplied during any convenient period of time be measured? *A* Yes.

[*1596*] *Q* How will that be done? *A* By suitable instruments.

Q And what is a common type of such instrument? *A* Electrical watt-meters and watt-hour meters.

* * * * * * [*1598*]

Mr. Wahrenbrock: Then may I ask—may I at this time offer Exhibit 59 for Identification in evidence.

Trial Examiner: Apparently there is no objection. It will be received in evidence.

(Exhibit 59 for Identification received in evidence as Exhibit 59.)

* * * * * *

Q Mr. Thomas, assuming that log sheet entries, meter records, and other data on which Mr. Miller based his study are substantially correct within the limits stated by him, and that he has correctly reflected those data in the figures which appear in his flow tables, and has correctly reflected them in his flow diagrams, in your opinion, is it valid to state that no electric energy was being supplied from generating capacity of The Hartford Electric Light Company at Hartford, Connecticut, from the generating capacity of The Torrington Electric Light Company at Torrington, and from the Falls Village generating plant of The Connecticut Power Company at Falls Village, Connecticut, or from any other connection of The Connecticut Power Company, and that none or only a limited amount was supplied as shown from the Robertsville plant of The Connecticut Light and Power

[*1599*]

Company, near Winsted, Connecticut, during the periods when he has so indicated? *A* Yes.

Q Directing your attention to those instances—

Mr. Branch: Excuse me. I didn't realize you had finished your question. May I have that read?

Trial Examiner: The reporter will read the question for the benefit of counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

[*1600*] Trial Examiner: Am I correct in believing that you read there "Is it valid to state?"

Mr. Wahrenbrock: Yes.

Mr. Branch: I object to that question as containing altogether too many questions involving a great many different subjects.

Trial Examiner: This appears to be in the nature of a hypothetical question. Is it possible to break this down into two questions, Mr. Wahrenbrock?

Mr. Wahrenbrock: Mr. Examiner, this isn't the simplest subject and it isn't the narrowest subject. I have a great many questions that are going to attempt to elicit a complete picture in each question. If we have to break it down it is going to destroy the complete continuity of the story. This is a technical question addressed to a man who has been qualified to consider it, who is being put on after study, after having had a chance to prepare himself, and I see no objection to covering as completely as this question attempts to cover the subject which it does cover.

Mr. Branch: I do object. I think he is asked to answer a good many different things in that question, and that it is improper.

Mr. Wahrenbrock: Well, if they can be answered, what is the objection?

Trial Examiner: It seems to me that the question is proper. [*1601*] However, I would like some explanation of what counsel means, of what the witness understands by the expression "valid".

Mr. Wahrenbrock: Well, the witness can make a statement, if you are addressing him.

Trial Examiner: I would like to have the witness make a statement as to how he understands it.

The Witness: I understand it in the sense of "correct".

Trial Examiner: With that understanding, the witness's answer will be permitted to stand. Your objection was more in the nature of a motion to strike, was it?

Mr. Branch: Yes, sir. I move to strike the answer, because the witness answered before I had an opportunity to speak.

Trial Examiner: The motion is rejected. You will note an exception for the respondent.

Mr. Wahrenbrock: I will now begin my next question over again.

By Mr. Wahrenbrock: *Q* Directing your attention to those instances as shown by Mr. Miller, in which the electrical energy requirements of the Winsted, Bristol and East Hampton districts of the Connecticut Light and Power Company were supplied from Massachusetts, and from Hartford generating capacity, except that a part of [*1602*] the Winsted requirements also have been supplied from the Robertsville plant of The Connecticut Light and Power Company, please state whether in your opinion each of those loads was supplied by electric energy from both of such sources, that is, Massachusetts and Hartford, as shown by Mr. Miller.

Mr. Branch: Same objection; also this isn't a proper way of putting in testimony.

Trial Examiner: The witness may answer the question.

A Yes.

By Mr. Wahrenbrock: *Q* And what would you say is the primary principle which underlies the statement made by Mr. Miller with respect to the relation of the ratio of Massachusetts energy to the total of Massachusetts and Hartford energy received by The Connecticut Power Company at South Meadow—

Mr. Branch: I object.

Mr. Wahrenbrock: May I complete my question, please?

Trial Examiner: You may complete the question.

By Mr. Wahrenbrock: *Q* (Continuing) —to the ratio of Massachusetts energy to the total Hartford and Massachusetts energy supplied to East Hampton, Bristol and Winsted.

Mr. Branch: I don't quite understand how, even within the scope of your Honor's rulings on the last two questions, this witness can be asked as to the underlying principles, as to [*1603*] work or opinion of some other man.

Trial Examiner: It seems to me it is rather far-fetched to state the principles underlying a statement. That pre-supposes the knowledge of this witness as to what the other witness had in his mind. I would suggest that be reworded to avoid that situation, Mr. Wahrenbrock.

Mr. Wahrenbrock: I would like to make a statement, Mr. Examiner. I am prepared to ask several questions which will come out the same place. However, I do want to point out that this witness has stated that he has heard the testimony, that he is familiar with the study that has been made, and I am asking him now about the validity of the statements made on the basis of that study.

Trial Examiner: He can state the underlying principles as regards the facts, but as to the statement, that involves a presumption that he knows the mind of the witness throughout.

Mr. Wahrenbrock: Would it meet your Honor's objection if I asked him the principle which underlies the conclusion, if it is a conclusion?

Trial Examiner: Is there an objection to the question on that point?

Mr. Branch: That is substantially the same thing, your Honor, and open to the same objection, and I would object.

Mr. Wahrenbrock: The point being that you have a statement of the facts shown by a study. I now wish to explore the [*1604*] engineering principles behind those facts. I am not interested in them as statements by any individual person, but as statements of facts, which I wish to explore.

Mr. Branch: It seems to me that statements of engineering

principles are a matter of opinion, and this matter can't interject principles which in his opinion are correct and as to somebody's conclusions.

Trial Examiner: I think he may do that. Having made a complete study of the matter himself, as I understand it, the objection will be overruled and the witness may answer the question in the second form given.

The Witness: May I hear it?

Mr. Wahrenbrock: If I may have just a moment, please?

[*1605*] Trial Examiner: I would suggest that counsel reword the question. It has been rather switched around now.

Mr. Wahrenbrock: Yes.

By Mr. Wahrenbrock: *Q* Mr. Thomas, what would you say is the primary principles which underlies the conclusion as stated by Mr. Miller with respect to the relation of the ratio of Massachusetts energy to the total of Massachusetts and Hartford energy received by the Connecticut Power Company at South Meadow—

Mr. Branch: It is understood that I object.

Mr. Wahrenbrock: May I be free to finish the question without interruption?

Trial Examiner: Proceed.

Mr. Wahrenbrock: The question is complicated enough without being interrupted twice.

Trial Examiner: Proceed.

Mr. Wahrenbrock: I am going to repeat it over again in order that the witness may have it in mind.

Mr. Branch: And will the witness wait then until I have an opportunity to object.

By Mr. Wahrenbrock: *Q* What would you say is the primary principle which underlies the conclusion as stated by Mr. Miller with respect to the relation of the ratio of Massachusetts energy to the total of Massachusetts and Harford energy received by the [*1606*] Connecticut Power Company at South Meadow to the ratio of Massachusetts energy, to the total of Hartford and Massachusetts energy supplied to East Hampton, Bristol, and Winsted?

Mr. Branch: I object. I don't see how this witness can state the principles which underlie someone else's conclusions.

Trial Examiner: The conclusions have been stated, and the witness will be permitted to answer. The objection is overruled.

The Witness: Where electric currents or electric energy coming from two sources enter a conductor at a certain point and traverse the conductor to some further point, the usual working concept or hypothesis is that the two currents mix and comingle in an intimate way, and that any portions of the mixed current drawn off from the conductor at various later points will have about the same proportions of the two component currents as was contained at the point of mixing. This is not based on tagging individual current flows, but on the common sense analogy with the mixing of streams of any kind in a long and narrow passage.

Q Is that principle consistent with all the known facts and with recognized and accepted engineering practice and principles?

Mr. Branch: Well, I think all he can do is give his opinion on that and I object to it unless it is put in the form of his opinion.

[*1607*] Trial Examiner: I suggest that this is an opinion, an expert opinion that you are asking.

Mr. Wahrenbrock: I will rephrase the question.

By Mr. Wahrenbrock: *Q* In your opinion, is that principle consistent with all the known facts and with recognized and accepted engineering practice and principles?

Trial Examiner: The witness may answer.

A Yes, so far as known to me.

By Mr. Wahrenbrock: *Q* In your opinion, is that a reasonable principle? *A* I will say that I subscribe to that principle.

Q Directing your attention to the instances of energy flow from Massachusetts as shown by Mr. Miller, and particularly to those instances in which all or a part of the electric energy requirements for the Winsted, Bristol and East Hampton districts of The Connecticut Light and Power Company, or one or more of them, were

supplied with electric energy from Massachusetts, at times when there was some generation of electric energy at the Falls Village plant, will you state what other primary principle underlies the conclusion that those loads were supplied in whole or in part from Massachusetts?

Mr. Branch: The same objection, on the ground that he is asked to state the principles as to someone else's conclusions.

Trial Examiner: The objection will be overruled. You [*1608*] may answer.

The Witness: The principle that there will be no simultaneous counter flow in any electric circuit, that is, that neither current nor energy can physically flow in both directions in the same conductor, at the same time.

Q Is that principle, in your opinion, valid and consistent with recognized and accepted engineering practice and theory? *A* Yes. I have agreed with the conclusions of Mr. Miller in the study of the power question, relying upon a well known axiom of the flow of current in electric circuits, namely, that current can flow in a single circuit, only in one direction, at any instant of time; that is, what might be termed simultaneous counter flow, cannot exist. This is equally true of energy. This fact is known by experience in electric systems.

I will use the expression E.M.F. as an abbreviation for electro motive force, voltage, or difference of potential. If now, the experiment be tried, first applying a single E.M.F. at one end of a circuit and noting the current, and then after removing the first E.M.F., of applying a second E.M.F. at the other end, and producing a second current in the circuit, and finally, of applying both E.M.Fs at the same time, it will then be found that the total current in the circuit will be the difference of the first two observed currents, and will be in the direction of the greater. In other words, energy cannot [*1609*] be delivered both ways over a circuit at the same instant of time. Of course, in the algebraic sense that when the two currents flow in opposite directions, one must be marked with a minus sign, then the resultant current will

be the sum of the positive current and the negative current, which is, of course, the same as the difference, and comes back to the original answer.

Q When you say "sum of the positive current and the negative current", do you mean the algebraic sum? *A* Yes.

Q Excuse me for interrupting. *A* This is but common sense, since if there is generation and consumption at both ends, obviously the generation at either end will be applied to the nearby load before energy will flow to the other end through the resistance of the line. This will leave a balance to be sent into the line at one end only. If the universally accepted hypothesis be applied that current flows in a conductor as other flows occur, it is obvious that the propelling forces that are set up in the conductor to move a portion of this current in one direction, cannot also move the other portion of the current in the other direction. Thus, it is shown that simultaneous counter flow cannot occur either with energy or with current.

Q Directing your attention to the instances as shown by Mr. Miller, in which electric energy requirements for the Winsted, [*1610*] Bristol, and East Hampton districts of The Connecticut Light and Power Company were supplied in whole or in part from Massachusetts, will you please describe in a general way the system of facilities by which that was accomplished, and state the functions performed by the several parts of that system respectively. *A* The facilities by which electric energy was conveyed from the Massachusetts line near Agawam to local consumers at East Hampton, Bristol and Winsted, may be listed as follows:

• From the State line to the South Meadow high tension outdoor substation of the CP Company, a double circuit 66 k.v. steel tower transmission line, until about March, 1941. These two circuits, each of which at the Hartford end includes an autotransformer, are identified by the company as C-3 and D-4. Soon after March, 1941, the D-4 line was changed over to 110 k.v., and connected through a 110 k.v. transformer directly to The Hartford Electric Light Company, 11 k.v. bus. The length

of transmission line from the State line to South Meadow is given at 27.14 miles.

The C-3 line since about March 1941, and prior thereto, both the C-3 and the D-4 lines, together with their auto-transformers were facilities for transmitting Massachusetts energy to the Connecticut Power Company's 66 k.v. bus at South Meadow.

The 66 k.v. lines, Cp-1 and CP-2, and the 66 k.v. branch [*1611*] lines connecting thereto, together with the 66 k.v. step-down transformers and all synchronous condensers to which they are connected, are facilities for transmitting electric energy to the corresponding substations including the substations at Middletown, Bristol, and Torrington. Since change in the D-4 line to 110 k.v., some time in March this year, the three circuits known as 122, 123, 124, at South Meadow, each including a transformer, connecting The Hartford Electric Light Company's 11 k.v. bus to The Connecticut Power Company's 66 k.v. bus, at South Meadow, may be such facilities, if at times, by reason of the circuit D-4 feeding energy to The Hartford Electric Light Company's 11 k.v. bus, they are transmitting mixed Massachusetts and Hartford energy from the 11 k.v. Hartford Electric Light Company bus to the 66 k.v. Connecticut Power Company bus.

The substation buses and equipment at the Middletown substation, and the 13.8 k.v. line, crossing under the Connecticut River by submarine cable, and leading to pole 110 in Portland, and before its removal in 1939, the extension of that 13.8 k.v. line to East Hampton, Colchester, and Leesville, and their step-down transformers are facilities for transmission of Massachusetts energy to East Hampton, Colchester, and Leesville.

Trial Examiner: I suggest that the witness suspend with his answer for a moment.

(A short intermission was taken.)

[*1612*] Trial Examiner: The witness may proceed with his answer.

A (Continuing) The outdoor substation of the C. L. & P. Company at Bristol—

Mr. Branch: I didn't hear that statement. May I have it read?

A (Repeating) The outdoor substation of the C. L. & P. Company at Bristol and the synchronous condenser and all auxilliaries therefore are facilities for transmitting Massachusetts energy to Bristol. This outdoor substation includes two three-winding step-down transformers, 66 k. v. to 13.8 and 4.6 k. v., the oil-circuit-breakers and disconnect switches for the control thereof, lightning arrestors, current transformers, and so forth, as well as the steel structure carrying the conductors.

Certain facilities on the Bristol switchboard, operated by the C. L. & P. attendant, used to operate oil breakers on Bristol Mountain at the Bristol tap on the C. P. 1 and C. P. 2 lines are included.

The 2.4 k. v. bus of The Torrington Electric Light Company and the C. P. Company's synchronous condenser connected to that bus in the Torrington substation.

Furthermore, as to the extent that they are used to improve the power factor of the load carried by the 27.6 k. v. line from Torrington, the Robertsville units and the 4.6 k. v. line from that station to Winsted also are facilities for transmitting [*1613*] Massachusetts electric energy to Winsted.

The 4.6 k. v. lines and the 13.8 k. v. lines connected to the Bristol 66 k. v. step-down transformers, as far as located within urban Bristol, and the 4.6 k. v. lines connected to the 27.6 k. v. step-down transformers in Winsted, as far as they are located within urban Winsted, and prior to July, 1939, the low tension lines supplied from the 13.8 k. v. lines at East Hampton, the 4.6 k. v. lines at Colchester and Leesville, together with all the house transformers and equipment for each of these, are and have been since 1935 facilities for the distribution of electric energy from Massachusetts.

These distribution facilities also include as a certain part thereof, the facilities for local distribution for the respective localities.

Mr. Branch: I ask that the answer be stricken out in so far as the witness characterized certain facilities as facilities for transmission of Massachusetts energy. It seems to me that that is a legal conclusion and that it is not proper. It does not seem to me that it was responsive to the kind of question which I understood it to be.

Trial Examiner: I think it is understood that the witness is speaking from a physical standpoint, and I see no reason why it is not permissible. The motion is rejected.

By Mr. Wahrenbrock: *Q* Referring particularly to the Winsted District of The [*1614*] Connecticut Light and Power Company, will you describe those facilities with somewhat greater particularity? *A* Beginning at the 4.6 k. v. bus in Winsted sub-station, and continuing to the source of energy, the following transmission facilities exist, exclusive of the transmission facilities of the Robertsville plant, which I have already discussed. Leads from the 4.6 k. v. bus to the 27.6 k. v. transformers and all instruments and appurtenances used in control of the line, the measurement of its energy, the step-down transformers, the 27.6 k. v. transmission line, the step-up transformers at the Torrington sub-station and the leads to the 2.4 k. v. bus of The Torrington Electric Light Company, and any instruments and appurtenances used in connection with the control of the line; also The Connecticut Power Company's step-down 66 k. v. transformer and the synchronous condenser and appurtenances, the 66 k. v. tap on The Connecticut Power Company's C. P. 1 and C. P. 2 lines. I will add the line-taps and step-down transformers serving the gravel operation near Burrville, which is a minor transmission terminal.

Trial Examiner: Just a moment. I think counsel has something to ask. Do I understand counsel's objection to these questions to be based upon the fact that the statement is made in the language of the Act?

[*1615*] Mr. Branch: The statement is made as characterizing them as transmission facilities for Massachusetts energy, which

seems to me to be an obvious attempt to have this witness say that certain facilities are, in effect, facilities for transmission of electric energy in interstate commerce, and I don't think that is proper.

Trial Examiner: I think the witness may state what the facilities do.

The Witness: I used the terms in the ordinary sense of the terms.

Trial Examiner: Do I understand you to mean that you used them in the sense that they are facilities which do transmit?

The Witness: For the conveyance or transportation.

Trial Examiner: I think with that understanding the testimony is admissible and does not constitute any legal conclusion. Is there any further question on the part of counsel?

Mr. Branch: Well, sir, I make a motion to strike it out. I don't know whether counsel for the Commission offers it solely with the understanding that you have, sir. I wish he would so state.

Mr. Wahrenbrock: Mr. Examiner, this line of questions is designed to bring out the physical description of the facilities and the functions served by them as part of the system which is [*1616*] being described. I propose to show further with respect to the concepts which are here being anticipated by respondent's counsel, the questions that are being anticipated—

Trial Examiner: You are not attempting to obtain any legal statement from an engineering witness, as I understand it?

Mr. Wahrenbrock: No, I desire him to state the engineering function, the electrical function, being served by these facilities.

Mr. Branch: I think he ought to leave out anything about Massachusetts because it seems to me that is a legal conclusion or a conclusion of purpose of the people who maintain them and which does not appear—

Trial Examiner: I don't think it necessarily is. I do not so understand the situation. With that understanding, as we now have it, the motion to strike is rejected.

Mr. Branch: Of course I have an exception.

Trial Examiner: The exception will be noted.

By Mr. Wahrenbrock: *Q* What function is served by the facilities owned and operated by The Connecticut Light and Power Company? Perhaps I should more accurately ask you what function was served by the facilities owned and operated by The Connecticut Light and Power Company from the substation of The Torrington Electric Light Company in Torrington, Connecticut to the low-voltage bus in the Winsted substation of The Connecticut Light and Power Company [*1617*] at Winsted?

Mr. Branch: I don't think it appears that this witness is sufficiently familiar with the history of what was done to answer.

Trial Examiner: What was the testimony of the other witness in that regard which this witness heard?

Mr. Wahrenbrock: During the period covered by Mr. Miller's study.

Mr. Branch: Well, I don't think this was so, to answer your question.

Trial Examiner: I do not recall such testimony. It may be that the witness is familiar with it, but I don't think it has been brought out.

Mr. Wahrenbrock: I don't understand the question.

Trial Examiner: I say I don't think the witness's familiarity with these particular facilities has been brought out. I don't believe they were described by Mr. Miller in detail.

By Mr. Wahrenbrock: *Q* Mr. Thomas, will you state for the benefit of the record the study you have made of the data with respect to these facilities, and of the facilities? *A* I have already given some detail on that subject. I will repeat that I have seen many of these facilities personally. I have had access to and have studied the maps provided by the companies owning them, to become familiar with the character [*1618*] and location of these facilities and I have also had a very good working knowledge of the transmission systems in Connecticut.

Trial Examiner: Does that apply particularly to the facilities referred to in this last question on which the question has arisen?

The Witness: Yes.

Mr. Branch: I object. It seems to me—on that question I am not questioning the gentleman's statement, you understand, but it seems to me that the general kind of a knowledge that an outsider would have would not necessarily be sufficient.

Trial Examiner: He states that he has studied various reports and material submitted by the company, as to just what he studied, that may be brought out in cross examination, if counsel feels that that is necessary. The witness has stated his familiarity, and you may proceed. The objection is overruled and an exception will be noted. Do you have the question in mind?

The Witness: I think so. The transmission or conveyance of the electric energy purchased from The Torrington Electric Company at Torrington to the Winsted 4.6 k. v. bus for distribution in Winsted.

By Mr. Wahrenbrock: *Q* Did those facilities serve any function of local dis- [*1619*] tribution? *A* No. I have in mind that near Burrville the gravel quary purchases three-phase energy for its operation at 440 volts, this energy being taken from the 27.6 k. v. line, which passes nearby. Special step-down transformers are provided by the C. L. & P. Company. This is an isolated industrial customer, who happens to be fed from the transmission line and the 440 k. v. lines do not constitute local distribution, for there is but a single customer.

Q Did I misunderstand you or did you say 440 k. v.? *A* I think perhaps I did. It should be 440 volts. "K. v." should be "volts".

Q What facts corroborative of the opinion which you have just expressed did you observe in your study of those facilities? *A* I will call attention to the fact that for some distance out from Winsted the 27.6 k. v. line carried a 4.6 k. v. distribution circuit for supplying local customers. Thus, one circuit is used for transmission and another, on the same poles, for distribution.

Q Will you explain the meanings and definitions of transmis-

sion and local distribution, as those terms are used and applied by persons particularly engaged or interested in the design, construction, operation or maintenance of electric utility systems?

[*1620*] Mr. Branch: I object to that. It seems to me that this is very similar to the questions which were asked and objected to of a witness whom I called who was familiar with this matter and your Honor ruled that the questions were improper.

Mr. Wahrenbrock: Mr. Examiner, I would like to be heard on that.

Trial Examiner: You may be heard on it.

Mr. Wahrenbrock: I think the Examiner will recall that in making my objection I objected that the purpose for which the term was used was not specified in Mr. Branch's question or request for a definition or an expression of meaning. I have here in my question carefully indicated the purpose for which the term is used.

Trial Examiner: Will you restate that so we have it definitely in mind?

By Mr. Wahrenbrock: As those terms are used and applied by persons particularly engaged or interested in the design, construction, operation or maintenance of electric utility systems.

Mr. Branch: May I remind you, sir, that my questions were very broad, so as to include all purposes, and not merely the one or the ones which have been designated, but in spite of that, objection to the question was sustained.

Mr. Wahrenbrock: That was the vice of the question. It did include all purposes, without differentiation.

[*1621*] Trial Examiner: I think this clearly shows that it is not intended as an interpretation of the Act or a matter of regulation, and I think that the statement requested by respondent's counsel from the witness was so broad as to include conclusions as to the intent of the language of the Act. For that reason, and with the understanding that this is taken only in that narrower sense, the witness will be permitted to answer. Exception will be noted. You may proceed. *A* Before answering the question,

I will explain that the terms "transmission" and "distribution" in electric utility systems, like other broad terms, may be used in a number of different relations and for different purposes, so that no single definition can be drawn for either term that will be consistent and useful in all cases.

For example, where the superintendent of a utility system is organizing his maintenance crews, he well may designate them as transmission crews and distribution crews. In this case he probably will divide the maintenance work between them according to the tools they would use and the particular skills required.

The distribution crew would work in the urban area where lines are on sidewalks and pole-transformers are used, and no heavy line work is done, while the transmission crews would naturally handle cross-country work, which is of a different character.

[*1622*] Another example: In setting up a system of books for a utility there would naturally be accounts for distribution and others for transmission. The items to be assigned to each would depend on what information the auditor wished to obtain or regulating commissions might require. This would obviously not be the same break-down as used by the superintendent of the line crews.

Again, in examining the operations of the system functionally, to analyze the facilities, to determine what facilities contributed to the principal functions, the terms "transmission" and "distribution" would naturally be used, and a study may be made to distinguish which facilities specifically contribute to the function of transmission and which to that of distribution.

A complication enters, in that certain of the structures in the system serve both functions at the same time, in varying degrees.

With this explanation, I will define the terms "transmission" and "distribution", in their functional sense, as outlined above in my answer.

The transmission of energy in a utility system is the conveying of the energy in bulk from a point at which it is available to a

point at which it is needed. Its significance is transportation or conveyance.

Distribution of energy in a utility system is a subdividing [*1623*] of the bulk energy delivered to a neighborhood, among the various consumers. Local distribution narrows the operation down to a group of consumers so closely associated as to use common distribution facilities without the necessity of considering the element of transmission between members of the group.

Transmission facilities are characterized by the search for low energy losses and economy of structural costs; local distribution by the convenience of customers and of the public and the general necessity of accommodation to many structural limitations due to the use of public rights of way, private yards, esthetic considerations, and so forth.

In cases where both functions are served by the same facilities, it is considered that a facility is a transmission facility, as long as a material part of its utility as measured by the requirements of design depends upon transmission of energy where distance is an obstacle.

By Mr. Wahrenbrock: *Q* What kinds of distribution other than local distribution are there, if any? *A* Primary and secondary distribution, perhaps others.

Q Will you explain? *A* When the service areas of electric utilities, as is usually the case, have two dimensions, a single transmission line is not particularly well adapted.

[*1624*] Trial Examiner: Will the witness explain what he means by "two dimensions"?

The Witness: I am thinking of the length and width of an area or field. I will state the answer again. When the service areas of electric utilities, as is usually the case, have two dimensions, a single transmission line is not particularly well adapted to transport to all sections of the area, each its allotted block of power.

It is often found desirable to make use of branch lines from various points on the main transmission line to make bulk deliver-

ies to particular territories. There is a sense in which this is distribution, even though the chief purpose is the overcoming of distance. Such a combination of transmission and distribution may be called sub-transmission or primary distribution, and is characterized by the use of line voltages approximating those of transmission. It still remains transmission, functionally speaking.

Again, where closely grouped ultimate consumers extend over considerable areas, as in large cities, the quantities of power to be delivered in one locality become important and distance enters into it as a material element. In such cases short supplementing lines are introduced to reduce losses and strengthen the service. These may be called secondary distribution.

[*1625*] Applying these definitions of distribution, it will be found that no two utility systems are alike and a certain flexibility must exist in the definition of the term "distribution".

[*1626*] *Q* Will you please explain what you mean by certain facilities serving a transmission or a local distribution function? *A* By the term "function", I have in mind the objective or plan of the designer of the line who must consider what purposes he wishes to accomplish, and what means he has at his disposal. In this functional analysis of facilities, the actual purpose of the design will guide as between transmission and distribution.

Q In the light of the explanations you have made, are the facilities owned or operated by The Connecticut Light and Power Company from The Torrington Electric Light Company substation at Torrington, Connecticut, to the low voltage bus in The Connecticut Light and Power Company substation at Winsted, facilities for the transmission of electric energy as distinguished from the local distribution of electric energy?

Mr. Branch: I object. I think—

Trial Examiner: I think the witness should be asked whether it is his opinion that they are.

Mr. Branch: I think certainly if the question is permitted, it is understood that this has no bearing on the interpretation of the Act, and unless it has such a bearing, it seems to me immaterial.

If it has such a bearing, it seems to me improper under your Honor's ruling.

[*1627*] Trial Examiner: I think it should be limited to the opinion of the witness.

Mr. Wahrenbrock: If there is anything more than that involved, as a result of Mr. Branch's objection, I would like to be heard.

Trial Examiner: You may be heard as to anything you feel may be involved.

Mr. Wahrenbrock: May I have Mr. Branch's statement read, please?

(Whereupon the statement as above recorded, was read by the reporter.)

Mr. Branch: I object on the grounds I have specified.

Mr. Wahrenbrock: I cannot admit that it has no bearing upon the interpretation or the application of the Act. I am perfectly willing to have it qualified in the witness's opinion.

Trial Examiner: With that understanding, that it will be reworded to make it a matter of opinion of the witness, we will proceed. I suggest that you first reword the question.

By Mr. Wahrenbrock: *Q* Mr. Thomas, in the light of the explanations you have made, in your opinion are the facilities owned or operated by The Connecticut Light and Power Company from The Torrington Electric Light Company substation in Torrington, Connecticut, to the low voltage bus in The Connecticut Light and Power Company substation at Winsted, Connecticut, facilities for [*1628*] the transmission of electric energy as distinguished from the local distribution of electric energy?

Mr. Branch: Well, I think it also ought to be qualified as to merely an engineering matter, or for what purpose.

Mr. Wahrenbrock: The question limits it to the explanations he has made.

Trial Examiner: I think with that in view it is understood that the expression "in his opinion" means his opinion as an engineer, and with that understanding the objection of respondent's counsel will be overruled. The witness may answer the question.

Mr. Branch: And may I note an exception?

Trial Examiner: The exception will be noted.

The Witness: Yes.

By Mr. Wahrenbrock. *Q* In so far as the energy so transmitted has been shown by Mr. Miller to be transmitted from Massachusetts and consumed at points in Connecticut, in your opinion are those facilities facilities for the transmission of electric energy which is transmitted from Massachusetts and consumed in Connecticut by persons other than transmitters thereof?

Mr. Branch: It seems to me that is clearly objectionable. It is an attempt to get through this witness something in the nature of a legal conclusion.

Trial Examiner: Will you read back the question?

[*1629*] (Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: With that in view, will you restate the objection?

Mr. Branch: Yes, sir, I will restate it. I object to it on the ground that this apparently has no purpose other than to obtain from this gentleman something in the nature of a legal conclusion. That is particularly apparent in that the question contains certain language about "the transmitter thereof", which is somewhat ambiguous language perhaps appearing in the Act itself. He is just trying, by substituting the word "Massachusetts" for "interstate", it seems to me, to have the witness state that these are facilities within the description of the Act. There could hardly be a closer resemblance between the language of the Act and the question than this. I object on those grounds.

Trial Examiner: Do I understand the objection is a quotation of a part of the Act in the question?

Mr. Branch: In substance, yes, sir.

Trial Examiner: I would like to have counsel state just what part of the Act.

Mr. Wahrenbrock: Mr. Examiner, I am perfectly willing to concede that the language in my question does parallel some

language in the Act. I am not asking for a legal conclusion. I am asking this engineer for a statement of engineering facts, [*1630*] in the light of the explanations of the meaning of the terms which he has just given—whether, as an engineering factual question, his conclusion is as I have asked.

Mr. Branch: May I make a statement, sir?

Trial Examiner: Yes, you may.

Mr. Branch: The Act provides that the provisions of part 2, and I now quote, "shall apply—"

Trial Examiner: What section?

Mr. Branch: Section 201-B, "apply to the transmission of electric energy in interstate commerce". Then I skip—they shall not apply, or—it says, "The Commission shall not have jurisdiction except as specifically provided in this part", and the part next following, and now I quote, "Over facilities used for the generation of electric energy, or over facilities used in local distribution only, or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter."

It is quite clear that the language used in this question is very close to the language in the Act, substitute for "interstate commerce", "Massachusetts energy", or something of that kind. But otherwise, it is almost verbatim the same.

Trial Examiner: I think that the language is sufficiently qualified by the previous statement of the witness that it is shown to be a matter of his engineering opinion and, certainly, [*1631*] in any event, the Examiner will not be placed in the position of taking any legal opinion into consideration if it should appear in any way to be an opinion as to law.

The objection is overruled. The witness will answer the question.

The Witness: Yes.

By Mr. Wahrenbrock: *Q* Directing your attention to the transformers to which you referred at Winsted, at The Connecticut Light and Power Company substation at Torrington, at The Tor-

rington Electric Light Company's substation at Torrington, or the substation of The Connecticut Power Company at Torrington, and to the transformers at the South Meadow substation at Hartford, will you describe the functions performed by those transformers? *A* To explain the operation of the particular transformers to which your question relates, it will be necessary, first, to make a few statements about electric power transformers in general. I will begin by explaining the nature of the magnetic action and counter E.M.F. in the electro magnet as used with alternating currents.

The simplest form of such electro-magnets consists of a magnetic core of iron, in the form of a laminated ring, or a hollow square, with a coil wound around and encircling the core. When excited by alternating current, the core is the seat of [*1632*] a continuously alternating magnetism. The strength of the magnetism varying exactly in correspondence with the strength of the alternating exciting current. The coil is known as the exciting coil for the magnet.

The pattern of the alternating magnetism in the core is a series of impulses, each consisting of a rising, followed by a falling value in one direction, in turn followed by another similar impulse, with rising and falling values in the opposite direction. An impulse in either direction is called an alternation, and a pair of alternations, one positive and one negative, is called a cycle. All cycles are alike as long as the exciting current is unchanged.

Since in any electric magnet the magnetism in the core must correspond to the magnetizing or exciting current, a proper E.M.F. must be applied to the primary coil to produce this current. The alternating magnetism thus requires an alternating exciting current, and an alternating applied E.M.F.

Now, in exciting an electro-magnet in the above manner, it is observed that an opposition to the applied E.M.F. occurs in the exciting coil, tending to oppose the flow of the magnetizing current. Observation further shows that this opposing or counter E.M.F., as it is usually termed, is at each instant of time exactly

proportional to the rate of increase or decrease of the magnetism in the core. To produce the exact pattern of change desired in the magnetism, it is necessary to [*1633*] apply an E.M.F. to the primary just equal to this counter E.M.F. Or, to look at the matter in another way, when an alternating E.M.F. is applied to an electro-magnet, the pattern of the change in the magnetism will automatically adjust itself so that the counter E.M.F. will exactly equal the applied E.M.F. This follows since neglecting the resistance of the windings there is nothing else to resist the flow of current, due to the applied E.M.F. This is a very significant feature.

To summarize, it has now been shown that when an alternating E.M.F. is applied to an electro-magnet, the effect is to produce a flow of exciting or magnetizing current of such a magnitude and such a pattern that the counter E.M.F. generated by the core, and acting opposed in the primary circuit, will always just equal the applied E.M.F. neglecting losses.

I will now consider the observed behavior of a transformer, which in its simplest form is nothing but an electro-magnet with a closed magnetic core, but with two separate one-turn coils wound thereon, in place of one. The core, as with the alternating current of the electro-magnet carries an alternating magnetism of the same special pattern. The coil used to magnetize or excite the core is called a primary coil. This is the basis on which the practical transformer designer works. But now, since the primary coil may, broadly speaking be placed at any point on the core, and since it has no actual contact with the core, the same counter E.M.F. would be ex- [*1634*] pected to appear in both of the two coils wound on the transformer coil, for the core has no way of distinguishing one from the other. Such is the observed fact. The same counter E.M.F. will appear in all one-turn coils wound on the same excited core.

It should be pointed out, however, that while the so-called counter E.M.F. is, in fact, directed to oppose the applied E.M.F. in the primary coil, there is no E.M.F. applied to the second coil,

and the counter E.M.F. is not a counter E.M.F. in that coil, but a straight electro-motive force. It may be used as any other electro-motive force to produce current flow in any appliance connected to the terminals of the coil. Thus, by the use of two coils and a core, it is possible to reproduce in a second coil the E.M.F. applied in a primary circuit, not conductively connected with the second circuit, the second E.M.F. being available for practical use. The E.M.F. and any current in the second coil are called secondary E.M.F. or secondary current.

But one important matter must be noted. When advantage is taken of this opportunity to use the secondary voltage by connecting it to an electric appliance, current will then flow in the secondary in the usual way in electric circuits. This current will have an effect on the magnetism in the core, or will tend to, since any current in a coil wound around the core will act as an exciting current. This tendency is [*1635*] directed to oppose the change in magnetism in the core which produced the counter or secondary E.M.F. of itself.

It should be remembered that the exciting current in the primary has adjusted itself so that the pattern, of changes in the magnetism will give a counter E.M.F. exactly equal to the applied.

The secondary current is thus a disturbing factor. The transformer, however, takes care of this disturbing factor very easily, by merely increasing the current in the primary just enough to neutralize the opposing effect of the secondary current on the magnetism in the core. That is, every flow of current in the secondary coil is simultaneously accompanied by an increase of flow in the primary, just equal to the secondary current and opposite in direction around the core.

Obviously, the exciting current in the primary, and the strength of the magnetism which must correspond thereto, is unchanged, since the tendency of the secondary current to reduce the magnetism is just balanced by the opposing tendency of the increase in the primary current. It is thus true that the magnetism of the core, or the magnetic flex, as it is usually termed, does not change mate-

rially with changes in load, even with changes from full load to no load.

I will also state that in commercial power transformers, the amount of energy stored in the magnetic core at the time of highest magnetization is but a very small fraction of the [1636] amount of energy transferred from the primary to the secondary in one alternation.

Trial Examiner: I might verify one point, Mr. Thomas. Do I understand that the e.m.f., or electro motive force is the product of the voltage by the amperage?

The Witness: No. The electro motive force is the pushing force, as a result of which current will flow in a circuit. But when you come to find out how much energy has been expended in producing that flow, you will multiply the electro motive force by the current.

Trial Examiner: Multiply the electro motive force by the current or the voltage?

The Witness: The electric motive force and the voltage are the same thing.

Trial Examiner: All right. That clarifies that point. I am a little rusty on some of these things.

The Witness: It is now seen, as is observable in the actual operation of the transformers, that e.m.f. is available in the secondary of the exciting transformer, and when current is taken from there that an exactly equal current corresponding appears in the primary coil, and since the e.m.f. is the same in both coils, each having a single turn, an amount of electric energy equal to the amount of energy taken out in the secondary must be simultaneously supplied to the primary.

By Mr. Wahrenbrock: If you will permit an interruption, [1637] Mr. Thomas, I am not sure I properly understood you. In the beginning of that last sentence, did you say—did you refer to an exciting transformer or to an excited transformer?

The Witness: Excited—e-x-c-i-t-e-d.

Trial Examiner: Not in the vernacular sense of the word, I presume.

Mr. Wahrenbrock: They may be exciting before we get through, Mr. Examiner.

The Witness: This is the operation of a transformer, transferring energy from one form to another. It is of the greatest practical importance. But the mode of operation of the transformer permits the securing of another all-important advantage. While the above described elemental power transformer has only two one-turn coils, the common power transformer has many primary and many secondary turns, each of which is energized with its own e.m.f., just as do the one-turn coils I have been discussing. Obviously, if a high voltage is desired in the secondary, many secondary turns may be connected in series, the same current passing through all the coils, and each coil adding its e.m.f. to that of all the others, as a result, producing a high total e.m.f. In other words, the electric energy having been supplied to the secondary turns, these turns can be connected so as to produce a higher voltage than the primary e.m.f. This is called a series connection. It is the same expedient as is used in getting a high enough [1638] voltage in a battery of dry cells to operate a six or a twelve volt lamp, or for the commercial two or three cell automobile starting battery, and for getting transmission line insulation of sufficient resistance to support very high voltages, and is available for innumerable uses.

I recall that the famous and very early Thury transmission system in Europe, making use of constant current, obtained a high transmission voltage by connecting separate generators in series, just as transformer turns are connected in series.

On the other hand, if the secondary voltage of a single turn coil is high enough for the circuit requirements, and a large current capacity is desired, the several secondary coils may feed in parallel or in multiple into the secondary circuit, each coil contributing its bit of current to the total current.

The terms "parallel" or "multiple" relate to the system of con-

nections in which a total entering current divides between several pairs, no element of current passing through more than one path. Obviously, this juggling of turns may be applied to the primary as well, to adapt the primary coils to fit that particular applied e.m.f. that happens to be available.

The principle of combining primary and secondary turns in various ways has a wide range of flexibility, and it is the business of the designer to make the most-efficient adjustment for any particular case in hand.

Since the expedient of combining of secondary turn can [1639] be availed of, only after the energy has been delivered to the secondary, the action of the transformer in transferring energy from one coil to another is in no way affected.

As a practical matter, it is the fact that primary and secondary turns may be differently combined to give different primary and secondary voltages,—I am not sure how I stated that. May I repeat?

As a practical matter, it is the fact that primary and secondary turns may be differently combined to give different primary and secondary voltages that gives the power transformer its greatest utility.

Referring now to the transformer of your question, and their functions, I will explain that the 27.6 k.v. transformers at Winsted receive the energy from the transmission line from Torrington and deliver it to the 4.6 k.v. bus at Winsted substation, thus being a link in the chain of transmission from Massachusetts to Winsted. The action of these transformers is as I have just described for power transformers.

The energy received in the 27.6 k.v. primary is delivered to the 4.6 k.v. secondary. The number of turns in series in the primary winding is adjusted to the transmission line voltage, and the number of turns in series in the secondary, to the 4.6 k.v. distributing e.m.f. circuit.

Please strike out "e.m.f". "Distributing circuit".

"The 27.6 k.v. step-down transformer at Torrington serves

[*1640*] similarly to pass the electric energy received from the Torrington Electric Company in the 2.4 k.v. circuit to the 27.6 k.v. transmission line.

These transformations are practically instantaneous, and with very small losses.

The 66 k.v. step-down transformers at Torrington receive the energy from The Connecticut Power Company, 66 k.v. transmission line, and deliver it to The Torrington Electric Light Company 2.4 k.v. bus, the buses from which The Connecticut Light and Power Company obtain energy for Winsted.

The only other transformers in the path of the energy flowing from Massachusetts to Winsted prior to about March, 1941, the time of the change of the voltage of the line D-4, are the two auto-transformers at the outdoor substation of The Connecticut Power Company at South Meadow. These serve, each in its own circuit, for conveying the energy coming from Agawam in the 66 k.v. circuit to the 66 k.v. Connecticut Power Company bus, all at South Meadow.

At the same time, the transformer adjusts the line voltage of the Agawam line to suit the requirements of the CP1 and CP2 lines.

Mr. Branch: I move that there be stricken from that response all references to such things as "these transformers constitute a link in transmission of energy from Massachusetts to Winsted", and similar expressions. I think, in regard [*1641*] to other transformers, it seems to me that is not responsive to the question, and that it is improper, and it is an attempt to put in something to characterize what may be the legal effect or the subjective purpose of these transformers.

Trial Examiner: I understood the witness to mean that is the physical effect. Now, with that in view, I see no reason why this should be stricken, and the motion to strike is rejected. We have now reached a period a little past the middle of the afternoon, and we will take a five-minute recess.

(At this point a short recess was taken, after which the hearing was resumed.)

[*1642*] Trial Examiner: The hearing will now be in order.

By Mr. Wahrenbrock: *Q* Mr. Thomas, having referred to the auto-transformers in the South Meadow substation, will you explain the action of those auto-transformers and if it is convenient to do so, refer to any diagram you may have? *A* Any common power transformer of the proper design may be connected to serve as an auto-transformer. With this statement, further explanation of this auto-transformer action will be given.

The auto-transformer is usually made use of only when a minor change in line-voltage up or down is to be effected. When the auto-connection of a transformer is made us of, instead of following the usual two-coil method of feeding the delivery circuit from the secondary of a transformer whose primary is fed from the supply, use is made of a smaller transformer which acts to add to the supply the additional amount of voltage necessary to increase the voltage from the supply-circuit up to the voltage required in the receiving circuit.

I will explain this auto-transformer principle, which is only a special application of the two-coil transformers in normal operation by referring to a rough sketch, which I produce.

Mr. Wahrenbrock: I hand the reporter, for identification as Exhibit No. 63, the sketch referred to and hand respondent's counsel and the Examiner copies thereof.

Trial Examiner: Respondent's counsel has had an opportunity [*1643*] to see it? I don't think it takes long to look at it. It will be marked as Exhibit No. 63 for Identification.

(Document referred to was marked as Exhibit Number 63 for Identification.)

Trial Examiner: I presume this copy is made with an indelible pencil?

Mr. Wahrenbrock: The copy you have is a carbon copy of a pencil sketch. The original is a pencil sketch.

Trial Examiner: Yes.

The Witness: In this sketch the primary coil and the secondary coil of an ordinary two-coil transformer are shown. The leads of the primary are shown and the leads of the secondary similarly. The problem is to provide from the lower voltage-supply circuit shown a higher voltage for the receiving circuit shown. The design of the transformer is such that the secondary voltage is just equal to the difference in voltage between the receiving and the supply circuits.

With the connections in the sketch it is clear that current passing from the left hand wire of the supply circuit, marked "1" will traverse the secondary of the transformer and that in that winding there will be added enough voltage to that already available in the supply circuit for the total to equal the voltage required in the receiving circuit.

If now there is energy to supply the primary winding and a circuit to excite it, the operation is complete. As shown, [*1644*] the primary leads are connected to the supply leads "1" and "2" which provides both excitation and energy in the usual way.

I have marked with arrows on the face of the sketch the course of the current through the primary and secondary windings, and in the receiving and supply circuits.

Thus the size of the transformer need be only great enough to raise or lower the voltage by the difference in the voltages between the supply and the receiving circuits. If this difference is only ten or fifteen per cent of the supply voltage, the advantage of having to build a transformer for only ten or fifteen per cent of the total energy is obvious.

The auto transformers at South Meadow, connected to the 66 k.v. lines from Agawam to the 66 k.v. bus at the same point are of this sort.

Observation will show that the only action necessary to change a two-coil ordinary power transformer to an auto-transformer is a connection between one of the primary leads and the proper secondary coil lead. This connection may be made either outside or inside the transformer. It is usually made inside.

Q What is the approximate loss of energy in such transformers; under normal operating conditions? *A* Usually less than 2 per cent when the transformers are [*1645*] reasonably well loaded. The losses due to magnetism in the core which is fully excited at all times, cause a greater percentage of loss when the load on the transformer is light.

Q Will you please state how electric energy may be defined? *A* The electric energy is energy being conveyed in an electric circuit. Its amount at any instant may be measured by the product of the current and the e.m.f.

Q Aside from the losses to which you have referred, is there any difference between the amount of electric energy which enters each of those transformers and the amount which leaves it? *A* No, excluding the exciting energy supplied through the primary winding.

Q I am not sure that I have made my statement sufficiently clear to indicate whether the reply you have given applies only or particularly to an auto-transformer, or to power transformers generally. I will therefore repeat the question to ask what is the approximate loss of energy in power transformers under normal operating conditions? *A* The same answer.

Q And aside from the losses to which you have referred, is there any difference between the amount of the electric energy which enters a power transformer and the amount which leaves it? *A* No, considering my exception of the exciting energy.

[*1646*] *Q* How much does this exciting energy amount to? *A* Substantially negligible, about one per cent compared with a full load operation.

Q Is it possible for any different amount of electric energy to enter a primary coil of the ordinary power transformer than that which leaves the secondary coil thereof—

Mr. Branch: Excuse me. I didn't understand that. May I have it read?

Mr. Wahrenbrock: May I complete it?

Trial Examiner: Will you read the answer back? Was your question completed?

Mr. Wahrenbrock: No, I was interrupted before I could complete it.

Trial Examiner: Permit counsel to complete his statement and then we will have the whole question read back. I think that will be simpler.

By Mr. Wahrenbrock: *Q* —that which leaves the secondary coil, aside from such relatively small transformer losses and exciting energy?

Trial Examiner: Will you now read the question back for the benefit of respondent's counsel.

(Question read by reporter.)

Q Will you answer the question now, Mr. Thomas? *A* No.

Q And that is your reply to the question, is it? [*1647*] *A* Yes.

Q Is there any appreciable delay or difference between the time electric energy enters the ordinary power transformer and the time it leaves it, neglecting the exciting energy? *A* No.

Q Is it possible for electric energy to leave a transformer, an ordinary power transformer, at any substantially different time than it enters it, in commercial quantity excluding the exciting energy? *A* No.

Q Is any of the electric energy which enters any of those transformers, the ordinary power transformer, ever stored for anything more than a very small fraction of a second, at most, excluding exciting energy in the power transformer? *A* No. The energy stored in the core, however, goes in and out twice every cycle, or every sixtieth of a second.

Q And is that energy to which you have last referred, the exciting energy? *A* Yes.

Q Would the storage of electric energy for any substantial period of time in commercial quantities be possible in the ordinary power transformer? *A* No.

[*1648*] *Q* Will you please state how voltage and current may

be respectively defined? *A* Voltage is that thing which can be introduced into an electrical circuit and cause current to flow against resistance. It is not technically a mechanical force, the same as the force of gravity, but it has the ability to cause current to flow around a circuit. Current is the flow of electricity in an electric circuit, it is the flow in a conductor resulting from being subjected to the influence of voltage. An electric current manifests itself by its magnetic effect, by heating conductors, by the development of a mechanical force when placed across a magnetic field by the deposition of metals, and so forth.

Q Will you explain what differences there are, if any, between the primaries and the secondaries of ordinary power transformers in voltage and current in normal operations? *A* Taken turn by turn, and neglecting the excitation of the core and losses, there is no difference between the primary and secondary.

Q When a power transformer has been designed and constructed, with the primary and secondary winding, suitable to give a prescribed ratio of primary and secondary voltages, would it be necessary to redesign or reconstruct the transformer, to secure a different voltage ratio? [*1649*] *A* No, it would be sufficient merely to reconnect the primary or the secondary turns both, so as to change the number of turns in series.

Mr. Branch: I am sorry, there was so much noise that I lost some of both the question and the answer. May I have them read?

Trial Examiner: The question and answer will be read back for the benefit of respondent's counsel.

(Question and answer read.)

By Mr. Wahrenbrock: *Q* Are power transformers commonly so designed as to permit ready change of the number of turns in series? *A* Yes. In most localities 110 volts is used for local consumption, and in many others 220 volts, and in some, both voltages. As a great convenience to users and manufacturers, standard transformers are built to supply either voltage. The change from 110 to 220 volt delivery in such a transformer is made by connecting in series two coils that have been operating in paral-

lel for the 110 volt use. Provision is made for making convenient reconnection outside the case. There are many other instances of transformers in which a change of connection is made outside the case.

Q Could a similar change in ratio between primary and secondary e.m.fs. be secured in any other way? *A* Yes, two similar transformers connected with primary [*1650*] coils in parallel, and their secondary coils in parallel will give a certain appropriate ratio between primary and secondary e.m.f. If now the secondary coils of the two transformers be connected in series, with the primaries still in parallel, the secondary voltage and voltage ratio of the pair will be doubled. This is analogous to the increase in ratio by reconnecting the secondary turns in series in a single transformer.

Q Are the changes in voltage and in current, which are obtained by the manner of connecting the turns of the primary and secondary, changes of such a nature that the voltage and current in the secondary circuits cannot subsequently be changed back to the original voltage and currents or to any other voltage and current commonly in use? *A* The voltages and currents in an electric circuit can be changed up or down at various points, as may be desired, but the current and voltage changes will, of course, always be in inverse ratios.

Q By "inverse ratios" you mean in inverse ratios to each other? *A* As the voltage goes up the current goes down.

Q What facilities would be necessary to accomplish such a further change in voltage and current? *A* Other transformers.

Q And would such transformers function in substantially [*1651*] the same way as those you have already described? *A* Yes.

Q Is there anything about the operation or function of any of these transformers, to which you have referred, at Hartford, Torrington and Winsted, which prevents a further change, or any number of further changes of the voltages and current to any voltage and current which may be desired in connection with the

further transmission or utilization of the electric energy for any of the common purposes within the limits of the capacity of the system to supply the necessary amount of electric energy? *A* No. Neglecting losses and remembering that voltage and current changes are in inverse ratios, I may point out that after having been stepped up to 66 k.v. at the generating stations, the Winsted energy has been stepped down to 2.3 k.v. and up to 26.7 k.v. at Torrington, before being finally stepped down to 4.6 k.v. at Winsted.

Q I notice that you gave two figures for the voltage on the line between Torrington and Winsted. Do you recall whether it is 26.7 or 27.6? *A* 27.6 I should have read it.

Q You have spoken of energy—

Mr. Wahrenbrock: I will withdraw that.

Q Directing your attention to the instances as shown by Mr. Miller, when electric energy requirements of the Winsted [1652] District were supplied solely from Massachusetts, except in so far as Robertsville may also have been supplying a part of such requirements, will you explain what would happen if any part of the circuit in the Torrington-Winsted line or the transformers at each end of that line should suddenly be removed or fail? *A* The circuit would be interruped, and the flow of energy stopped.

Q If there is a sudden failure in any part of any of the facilities serving the transmission function, what happens to the operation of the rest of such facilities? *A* Normal operation is interrupted.

Q Considering a single typical transmission circuit, is the transmission at every point in the system between the generating facilities and the local distribution facilities continuously dependent and contingent upon the transmission at every other point? *A* Yes. The transmission of power over any electric circuit is necessarily continuous over the whole line. In the absence of a complete circuit, transmission cannot occur.

Q You have spoken of energy flowing or passing along a circuit and have stated that the transfer of energy is practically instantaneous. Can you explain this a little more fully? *A* Assume

a generator on one end of a single circuit [*1653*] and a lamp on the other, with its switch open. Assume further that the generator is operating and the line alive or hot. This means that the generator e.m.f. is striving to pass current around the circuit from the positive terminal to the negative, but that the circuit is interrupted at the lamp. In other words, the generator e.m.f. is transferred to the lamp terminals. When now the lamp circuit is closed, the current starts to flow in the lamp all the way from the generator around the circuit. It cannot flow without the e.m.f. in the generator, nor without the path through the lamp.

Q Directing your attention to the instances shown by Mr. Miller in which electric energy requirements of the Bristol District of The Connecticut Light and Power Company were supplied in whole or in part from Massachusetts, will you please describe the system of facilities by which that was accomplished, in so far as you have not already done so? *A* Energy is distributed in Bristol over both 13.8 k.v. and 4.6 k.v. facilities. The 66 k.v. transformer at Bristol already mentioned is so constructed as to have the two low-tension windings, one supplying 13.8 k.v. and the other 4.6 k.v., and hence is able to supply energy at both voltages. This transformer and this circuit are provided with certain auxiliary equipment for measuring the energy flowing and controlling the circuit, which are necessary for the proper operation [*1654*] of the station.

Furthermore, there is provided a 13.8 k.v. synchronous condenser to assist in maintaining the voltage of the 13.8 k.v. and 4.6 k.v. bus. The synchronous condenser located at the substation is somewhat similar in construction to an alternating generator and serves to relieve the transmission line of lagging current. The effect of this is to greatly reduce the voltage loss in the transmission lines, or which is the same thing, to increase the capacity and reduce the line losses.

This is the principal purpose for the introduction of these and all other such synchronous condensers.

The primaries of the 66 k. v. transformers are connected to the

66 k. v. line tap leading from lines C.P.1 and C.P.2 nearly, this being the path by which energy reaches the Bristol substation.

In further explanation of the action of the synchronous condenser, I may say that the large number of electric motors and similar type of appliances found on utility distribution lines, of which those in Bristol are no doubt a typical example require a large amount of exciting current, somewhat as do the transformers in a system. This exciting current is difficult for a transmission line and step up and step down transformers to handle, and it tends to cause an excessive depression of the line voltage and excessive losses.

[*1655*] A synchronous condenser has the capacity to relieve the transmission lines of this exciting or lagging current and thus serves to reduce the natural loss in voltage and energy.

The synchronous condenser is introduced at Bristol as similar apparatus is at Torrington and Middletown, to facilitate the operation of the transmission lines and the step up and step down transformers.

Q What function is served by the facilities owned and operated by The Connecticut Light and Power Company from the low-voltage buses to the connection of the high line at the substation structure, including the synchronous condenser at Bristol? *A*. The transmission of electric energy.

Q Did those facilities serve any function of local distribution? *A* No.

Q In the light of the explanations you have previously made, in your opinion, are those facilities for the transmission of electric energy as distinguished from the local distribution of electric energy?

Mr. Branch: Well, I object. It seems to me here is an open attempt to get the witness to state an opinion on what is a question of law.

Trial Examiner: I think it should be clear what the nature of the opinion is.

[*1656*] Mr. Wahrenbrock: Mr. Examiner, there is certainly

nothing hidden here. I agree that it is open. As to what kind of an attempt it is, I will say that it is exactly the same question which was previously put with respect to corresponding facilities at Winsted to Torrington. The question raises no issue not raised by the exactly similarly worded question with respect to those facilities.

Trial Examiner: An objection has been raised, and I assume that the witness may be entitled to express an engineering opinion if the question is so worded.

Mr. Wahrenbrock: It was so worded.

Trial Examiner: I believe it is not. I believe the question asks him to express an opinion. If you will state the question in such a way that it clearly appears on the record to be an engineering question, it will be permitted.

Mr. Wahrenbrock: Mr. Examiner, it is qualified in two ways. It is qualified by asking him for his opinion, and it is qualified by the reference to the explanations he has previously given with respect to the meaning of those terms used in the question, as he has defined them.

Trial Examiner: I think it is very simple. The request of the Examiner is that you ask him to express his opinion as an engineer. I see no reason why the question cannot be worded that way.

Mr. Wahrenbrock: If that is intelligible to the witness, I [*1657*] am perfectly willing to so qualify it.

Trial Examiner: Will you word it then? Restate the question.

By Mr. Wahrenbrock: *Q* In the light of the explanations you have previously made, in your opinion as an engineer, were those facilities for the transmission of electric energy as distinguished from the local distribution of electric energy?

Mr. Branch: My objection is noted?

Trial Examiner: The objection is overruled to the question as now stated. You may answer.

A Yes.

[*1658*] *Q* In so far as the electric energy so transmitted was electric energy transmitted from Massachusetts and consumed in

Connecticut by persons other than a transmitter thereof, at the times indicated by Mr. Miller, were they facilities for transmission of electric energy transmitted from one State and consumed in another, by a person other than a transmitter thereof?

Mr. Branch: I object to that, particularly in view—in addition to the other reasons I have stated, that there is injected the words "the transmitter thereof". I don't think it is clear what that means.

Trial Examiner: I would like to hear that stated thoroughly. I would like to study that last part. The reporter will read the question.

(Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: I don't see where the clause "other than a transmitter thereof" adds anything to the statement of fact. Will counsel explain in what respect he feels that it does, or that it is material?

Mr. Wahrenbrock: I am trying simply to show the existence of a state of facts to which the provision of the Act apply. Naturally, if I am to come within the terms of the Act, I have to establish the facts to which they apply—to which the Act applies.

[1659] Trial Examiner: I think that can be divided into two questions.

Mr. Wahrenbrock: Mr. Examiner, I submit it can be divided into many questions, but if it is susceptible to being answered in the form given, I would like to have it so answered.

Trial Examiner: I don't think the witness should answer in the language of the statute. I think if it is placed in two questions, that difficulty can be avoided.

Mr. Wahrenbrock: There is no prohibition to have the witness state the facts, if he states them accurately, in a certain language, just because that language happens to be used in the law.

Trial Examiner: The witness may state it was so transmitted. He may state it was transmitted by someone other than—or that

it was used by someone other than the transmitter, but to tie that into one clause, I think it is an attempt to express a legal opinion.

Mr. Wahrenbrock: If it will save time, I will divide the question.

Trial Examiner: I think it will save considerable time.

Mr. Wahrenbrock: I will attempt to do so.

By Mr. Wahrenbrock: *Q* Mr. Thomas, in your opinion as an engineer, in so far as the electric energy so transmitted was electric energy transmitted from Massachusetts and consumed in Connecticut at the [*1660*] times indicated by Mr. Miller's study, were they facilities for the transmission of electric energy transmitted from one State and consumed in another?

Mr. Branch: Well, I think that is a legal opinion.

Mr. Wahrenbrock: It is a legal opinion to state whether in your opinion as an engineer something is true.

Trial Examiner: I think that may be a matter of engineering facts also, or aside from any question of the Act. The witness may answer the question. Your exception will be noted.

The Witness: Yes.

By Mr. Wahrenbrock: *Q* And was the electric energy so transmitted consumed by persons other than a transmitter thereof?

Mr. Branch: Well, I think all that amounts to is a construction of the word "transmitter", which is a word in the Act, and is obviously an attempt to get a legal opinion on the meaning of the Act.

Trial Examiner: I think that is an engineering question and I think all understand what is meant by the term "transmitter".

Mr. Branch: May I note my exception?

Trial Examiner: Your exception will be noted.

The Witness: May I hear the question?

Trial Examiner: The reporter will read the question to [*1661*] the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: Yes.

By Mr. Wahrenbrock:-*Q* Mr. Thomas, will you describe more fully the part performed by the three-winding step-down transformers in the Bristol substation, the part performed by those transformers in the transmission of electric energy transmitted from Massachusetts? *A* The three winding 66 k.v. to 13.8 k.v., or 4.6 k.v. transformer is a development of the two-winding transformers already described. It has been explained that in an excited transformer, every turn receives the same counter electro motive force. Also, that in a transformer with many secondary turns, these turns may be so combined as to secure either a low voltage secondary, or a secondary with large current capacity. By the same method, it is possible to group the secondary turns into two groups, or secondary coils, not connected metallically.

Further, it is possible to group the turns in each of these two secondary coils differently, so that one coil has a higher voltage than the other, and this has been done in the Bristol 66 k.v. transformer. For every turn in the 4.6 k.v. secondary winding, there will be 13.8/4.6 turns in the 13.8 [*1662*] k.v. secondary, and the e.m.f. in the two circuits will be in the same ratio. I would like to ask the reporter if she understood what I intended to say in putting in an oblique line between the two figures. That indicates that the first number is divided by the second.

Q You were intending to indicate an improper fraction? *A* Yes. By the law of the transformer, any current flowing into a secondary turn of any coil will require an equal current in a primary turn to balance. Flows of current in both of these secondary turns simultaneously require an increase in the primary, equal to the sum of the two secondary currents. Thus, current may be taken from either or both secondaries at any time, and the increased flow in the primary must equal the sum of the two. This is a very convenient type of transformer and is frequently used.

Q What are the approximate energy losses in such transformers under normal operating conditions? *A* These transformers have losses comparable with two-winding transformers. That is usually less than two per cent when fully loaded.

* * * * * * [*1665*]

By Mr. Wahrenbrock: *Q* Mr. Thomas, without repeating the explanation you have given of the nature of the magnetic action and counter e. m. f's. in the electro-magnet as used with alternating currents, and the explanation you gave of the observed behavior of the transformer in its simplest form, and the explanation you gave of the methods of connecting primary and secondary turns, respectively, in order to adjust primary and secondary voltages, will you explain the function of the three-winding transformer at Bristol, to which you have referred, in connection with the [*1666*] transmission of electric energy from Massachusetts?

Mr. Branch: I don't want to keep interrupting, but of course all of these questions I object to on the ground that they are tied up with an expression of opinion as to the transmission of electric energy from Massachusetts. May it be stipulated that my objection on those grounds goes to this whole line, so I won't have to interrupt?

Trial Examiner: All right, it will be so understood. The witness may answer the question.

A The transformer of the question serves to transmit the energy from the 66 k. v. tap from Bristol Mountain to the 13.8 and 4.6 circuits at the substation.

By Mr. Wahrenbrock: *Q* Aside from the approximate energy losses in that transformer, to which you have referred, is there any difference between the amount of electric energy which enters that transformer and the amount which leaves it? *A* May I hear that question again?

Trial Examiner: Would you read the question again to the witness?

(The record is read.)

A No, excluding exciting energy.

By Mr. Wahrenbrock: *Q* And how much would that exciting energy amount to at the maximum? [*1667*] *A* A substantially negligible quantity, of the order of one per cent of full load output.

Q Is it possible for any different amount of electric energy to enter the primary coils of that transformer than the total leaving the secondary and tertiary coils of that transformer, aside from such relatively small transformer losses and negligible amount of exciting energy? *A* No.

Q Is there any appreciable delay or difference between the time electric energy enters that transformer and the time it leaves the transformer, neglecting the exciting energy? *A* No.

Q Is it possible for electric energy to leave that transformer at any substantially different time than it enters it, in any commercial quantity, excluding the exciting energy? *A* No.

Q Is any of the electric energy which enters that transformer ever stored for anything more than a very small fraction of a second, at most, excluding the exciting energy? *A* No.

Q What can you say about the storage of energy in the core of that transformer? *A* The energy upon which the excitation is dependent, enters and leaves the transformer every alternation.

Q And how frequently is that? [*1668*] *A* It occurs twice every cycle, or one-sixtieth of a second.

Q Would storage of electric energy for any substantial period of time in commercial quantities be possible, in that transformer? *A* No.

Q Will you explain what difference there is between the primary and secondary and tertiary in that transformer in the voltage in normal operation? *A* Neglecting exciting current and taken turn by turn, there is no difference.

[*1669*] *Q* Would it be necessary to redesign or reconstruct that transformer to secure different voltage ratios? *A* No.

Q Will you explain? *A* I have already described the process by which that change could be made in connection with another transformer. The same reconnection of turns in this transformer will produce the same effect. I will add that if provision had been made before hand to do this outside of the case, the mechanical effort would be less than to make the changes in the present transformer.

Q Does the three-winding transformer permit of any further application of the explanation you made with reference to two-winding transformers as to the possibility of connections of secondary turns outside of the transformer? *A* It would be of course possible to connect the two secondary coils in series, giving a resultant voltage equal to the sum of the two voltages.

Q When you spoke of two secondary coils, did you refer to the secondary, what is ordinarily known as the secondary and tertiary windings? *A* I referred to the 13.8 k.v. and the 4.6 k.v. windings.

Q Are the changes in voltage between the three windings changes of such a nature—I will restate that, please. Are the changes in voltage and current as between the three wind- [*1670*] ings changes of such a nature that the voltage and current in the 13.8 and the 4.6 k.v. circuits cannot subsequently be changed back to 66 k.v. or back to the original voltage and current, or do any other voltage and current commonly in use? *A* This can be done.

Q What facilities would be necessary to do it? *A* Additional transformers.

Q Would such transformers function in substantially the same way as those you have already described? *A* Yes.

Q Is there anything about the operations or function of the Bristol three--winding transformer which prevents a further change or any number of further changes in voltage and current to any voltage and current which may be desired in connection with the further transmission or the utilization of electric energy for any of the common purposes within the limits of the capacity of the system to supply the necessary amount of electric energy? *A* No.

Q In that answer, do I understand that you neglected the transformer losses and exciting current which you referred to as negligible? *A* In as far as they may affect the result.

Q Directing your attention to the instances as shown by Mr.

Miller, when electric requirements of the Bristol district [*1671*] were supplied solely from Massachusetts, will you explain what would happen if any part of the transmission facilities as you have described them in the Bristol substation should suddenly be removed or fail? *A* The circuit would be interrupted and the transmission stopped.

* * * * * * [*1677*]

Q Mr. Thomas, in my last questions of yesterday's session, I was asking about the three-winding transformer at Bristol. Will you please state whether there is more than one such transformer there. *A* There are two. I will state that so far in my testimony I have assumed three phase transmission circuits. I have been referring to transformers without distinguishing between a three phase transformer and a bank of three single phase transformers, even though in some cases in the system, as for example, Winsted, three phase transformers are used, while in others, as in Bristol, banks of three single transformers are used. This corresponds with the usual convention in one line diagrams of utility systems.

Q Are those transformers and their appurtenance facilities, including the synchronous condensers at Bristol, facilities for the transmission of electric energy from a distance?

Mr. Branch: The same objection that I stated previously [*1678*] in regard to this type of question.

Trial Examiner: The objection is overruled. The witness may proceed.

The Witness: Yes. That is, these step-down transformers and appurtenances, including the synchronous condensers, are a most important part of the facilities for transmitting electric energy from Massachusetts to Bristol. As is well understood, it is not practically feasible to transmit electric energy over considerable distances at generation voltages, nor to utilize the energy of transmission voltages in consumer appliances. It is therefore necessary, when using electric energy generated at a distance, to

raise the voltage to transmission value, at the sending end of the line, and to lower it to local distribution voltages at the receiving end. The transmission operation is not complete until the energy has been restored to the local distribution voltage and all the facilities involved in the restoration, including the synchronous condensers, are a part of the transmission facilities. They are all facilities that would not have been used if no transmission had been required.

Q Is what you have just said—

Mr. Branch: Excuse me. The witness was asked a certain question, and in the course of that he gave a long answer. A good deal of it was not responsive, but I am not going to base a motion on as much of that as I might, but merely ask that the [*1679*] references to transmission from Massachusetts be stricken out as not responsive, and it is not called for by anything that this witness knows of his own knowledge.

Mr. Wahrenbrock: Mr. Examiner, there was no reference in the answer to transmission from Massachusetts by name. That is, the word "Massachusetts" was not used.

Mr. Branch: May I have the answer read?

Trial Examiner: The answer will be read for the benefit of counsel.

Mr. W hrenbrock: I withdraw that comment. It was not used in the second part of the answer, to which I understood the objection to be addressed.

Mr. Branch: My objection is addressed to that part where he used the word "Massachusetts energy".

Trial Examiner: The reporter will read back the answer.

(Whereupon the last answer as above recorded, was read by the reporter.)

Trial Examiner: I believe the use of the expression is only descriptive of what he has already spoken of there, as to which he is familiar, of his own knowledge, according to his own statements. The answer will be permitted to stand. The motion is rejected.

By Mr. Wahrenbrock: *Q* Is what you have just said about raising voltage in order to transmit electric energy over some distance applicable [*1680*] to the Torrington to Winsted line and the transformers at each end? *A* It is.

Q Directing your attention to the instances prior to July 1, 1939, as shown by Mr. Miller, in which electric energy requirements of The Connecticut Light and Power Company's system in and near East Hampton, Leesville and Colchester, was supplied in full or in part with electric energy from Massachusetts, will you please describe the system of facilities with which that was accomplished, in general terms?

Mr. Branch: Just a minute. I am sorry, but these questions are so involved that I can't follow them.

Trial Examiner: Will you read the question back for the benefit of counsel?

(The record is read.)

Mr. Branch: Thank you.

A As already described, these facilities, starting at the East Hampton 2.3 k. v. bus were prior to July 1, 1939 the 13.8 k. v. to 2.3 k. v. step-down transformers at East Hampton, the 13.8 k. v. lines from Pole 110 near Portland to East Hampton, the 13.8 k. v. lines from the 13.8 k. v. bus at the Middletown substation to Pole 110 at Portland, the 66 k. v. to 13.8 k. v. transformers and buses at Middletown and appurtenances including the synchronous condenser, and the 66 k. v. lines [*1681*] and appurtenances coming from Massachusetts, as already described.

The 13.8 k. v. lines from Colchester and Leesville to East Hampton and the 13.8 k. v. transformers at Colchester, Leesville, Comstock Bridge and Westchester, are also included.

Trial Examiner: Does the reporter have that as 13.8 in both cases there or did the witness say "15.8" in one case?

(The reporter indicated the figure was 13.8 in both cases.)

By Mr. Wahrenbrock: *Q* Mr. Thomas, I had a similar question in my mind with respect to the voltage of the bus at East Hamp-

ton with which you began. Will you state what the voltage of the East Hampton bus with which you began your description of facilities, was? *A* 2.3 k. v.

Q What function was served by the facilities owned or operated by The Connecticut Light and Power Company from Pole 110 in Portland to East Hampton and Leesville and Colchester, including the step-down transformers and appurtenant facilities at those points? *A* Transmission.

Q Do those facilities serve any function of local distribution? *A* No.

Q When I say "Do those facilities" I mean as of the period [*1682*] of time you have been speaking, that is, prior to July 1, 1939, and was your answer so intended? *A* The answer is the same.

Q What fact did you observe which was particularly corroborative of that conclusion? *A* In some cases distribution lines were carried on the same poles as transmission lines.

Q In the light of explanations you have previously made, were those facilities facilities for the transmission of electric energy as distinguished from local distribution?

Mr. Branch: Of course my objection to all of this, I think, appears, and it is understood, is it not? The general statement I made yesterday applies?

Trial Examiner: I think there is some question sometimes as to where a line of questions begins and ends. In case there is any doubt, I would suggest that counsel—

Mr. Branch: I haven't been interrupting, but I thought that I made a statement yesterday that I objected to all questions whereby this witness characterized functions or use as distinguished between transmission and local distribution. In case there is any doubt I ask that all of his testimony this morning be stricken on that ground, and I would like to have it stipulated that I have an objection to any question along this line that is asked.

Trial Examiner: The motion to strike is rejected. The [*1683*] continuing objection will be noted.

By Mr. Wahrenbrock: *Q* I wish to qualify that question, Mr. Thomas,—in your opinion as an engineer? *A* Yes.

Q On the basis of the showing—

Mr. Branch: Excuse me. Will you read that last question?

Trial Examiner: Will the reporter read the question back to counsel? As I understand that last qualification to the former question—Did you want the whole question read or just the last statement, counsel?

Mr. Branch: Just the last statement.

Trial Examiner: Will you read that qualifying statement that counsel made in regard to the question?

(Qualifying statement read.)

Mr. Branch: I wanted to make it clear that my objection was even to the question in that form, and I ask that it be stricken.

Trial Examiner: I had understood that it was in that form, in view of your general language, and the motion will be rejected.

By Mr. Wahrenbrock: *Q* On the basis of the showing made by Mr. Miller, were those facilities facilities for the transmission of electric energy which was transmitted from Massachusetts and consumed [*1684*] in Connecticut, in your opinion as an engineer?

Mr. Branch: The same objection.

A It was.

[*1685*] Trial Examiner: The objection is overruled.

By Mr. Wahrenbrock: *Q* Will you describe the function performed by the step-down transformers intervening between the 66 k.v. lines and Pole 110. *A* These transformers convey the energy down from the 66 k.v. lines to the 13.8 k.v. bus. They also reduce the 66 k.v. line voltage to the 13.8 k.v. of the East Hampton circuit.

Q What are the approximate energy losses in such transformers, under normal operating conditions? *A* Similar to other power transformers, usually less than two per cent on full load.

Q Now, directing your attention to the facilities by means of which the Connecticut Light and Power Company supplied elec-

tric energy to the Borough of Groton, and the latter supplied electric energy to Fishers Island Farms, Incorporated, and the Fishers Island Electric Corporation until some time early in 1941, will you please describe in a general way that system and the function performed by the several parts thereof? *A* Energy from the high voltage facilities of the C. L. & P. Company in Connecticut was supplied to the 33 k.v. line which transmits it to the so-called Groton Long Point high voltage substation. In this substation 33 k.v. to 6.9 k.v. transformers step down the voltage transmitted to 6.9 k.v. From here, the power was transmitted to Groton Long Point [*1686*] brick substation near the shore of the Sound by 6.9 k.v. lines, partly in an aerial cable. A submarine cable was connected to the 6.9 k.v. bus there until February 28, 1945.

Mr. Branch: Do you mean 1941?

The Witness: 1941, I beg your pardon. This cable carried the energy under a branch of the Sound to Fishers Island, where the voltage was converted to 2.3 k.v. for local use to Fishers Island. Energy was taken off the 33 k.v. transmission line at the Trails Corner substation in Groton on the way to the Groton Long Point high voltage substation by means of 33 k.v. to 2.3 k.v. step-down transformers for supplying the Borough of Groton system.

At the Groton Long Point brick substation, energy was also taken off at 2.3 k.v. for local distribution. There were at least three other taps on the 33 k.v. line between the generating station at Montville and Trails Corner.

While the Borough of Groton which is served by the municipal system is a well-built up community, Groton Long Point is sparsely settled, with nearly all the population along the shore, on both sides of the Groton Long Point substation there is some two miles of open country between the territory of the Trails Corner substation and the boundaries of the Groton Long Point area. Most of the 33 k.v. line from Montville is sparsely inhabited rocky land.

Q What function was served by the facilities owned or [*1687*]

operated by the Connecticut Light and Power Company from its generator buses in the State of Connecticut to the point of delivery to the Borough of Groton?

Mr. Branch: The same objection, of course, as to the Groton matter as to the other.

Trial Examiner: The objection is overruled.

The Witness: Transmission.

By Mr. Wahrenbrock: *Q* Did those facilities serve any function of local distribution? *A* (No answer.)

Q Did those facilities serve any function of local distribution? *A* No.

Q Will you explain? I will rephrase my question. In the light of the explanations you have previously made, were those facilities owned or operated by the Connecticut Light and Power Company facilities for the transmission of electric energy as distinguished from local distribution, in your opinion as an engineer? *A* Now, just what is the question?

Trial Examiner: The reporter will read the question for the benefit of the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: Does the witness have in mind what facilities counsel refers to?

[*1688*] The Witness: Yes. I will explain that in listing points at which energy is taken from the 33 k.v. line supplying Groton Long Point high voltage station, I am pointing out additional instances of what I have described as sub-transmission, or primary distribution. None of the facilities I have described, however, as transmission facilities, include any function of local distribution.

Mr. Branch: Well, I don't know that that is responsive. He was asked about certain facilities, and he made a general statement which may have applied to others.

Trial Examiner: I don't think the statement necessarily has been shown to be applicable to the particular question. I don't think the answer has been tied in with the question.

Mr. Branch: That is my point, sir. I ask that the answer be stricken.

Trial Examiner: Unless the witness is in a position to clarify the answer, it will have to be stricken.

The Witness: I would like to have a full statement of what the question is.

Trial Examiner: I suggest perhaps the quickest way of satisfying this is to strike the answer in accordance with the request of counsel for the respondent, and then permit the question to be read anew, and I suggest that the reporter read the question slowly to the witness.

(Whereupon the last question as above recorded, was read [*1689*] by the reporter).

Mr. Branch: Well, I think it ought to be clarified as to what was owned by the Connecticut Light and Power Company. I am not sure that this gentleman knows.

Trial Examiner: Is the witness familiar with the situation as to the ownership of facilities?

Mr. Wahrenbrock: Mr. Examiner, two questions back the witness for several paragraphs described the facilities.

Trial Examiner: I believe that is true.

Mr. Wahrenbrock: The question is as to those facilities owned or operated.

Mr. Branch: I think it appears in the evidence of Mr. Tiffany that the ownership of the Connecticut Light and Power Company stopped at a certain point along this line that has been described, and I think we ought to know clearly whether the witness is referring to some facilities which are not owned by the Connecticut Light and Power Company or whether—

Trial Examiner: The question itself says those facilities, and it is not any too clear as to just what facilities are referred to.

By Mr. Wahrenbrock: *Q* Mr. Thomas, at all times up to February 28, 1941, and after August 23, 1935, did the Connecticut Light and Power Company own or operate the 33 k.v. facilities up to the Trails Corner substation in Groton? *A* Yes.

[*1690*] *Q* Do you know whether The Connecticut Light and Power Company owned or operated the 33 k. v. transmission line from the Trails Corner substation in Groton to the Groton-Long Point high-voltage substation? *A* I cannot answer as to dates. They did at one time and their operation ceased, I believe, within the period you have limited, but I do not remember what date.

Q And do you know whether The Connecticut Light and Power Company owned the 33 k. v. to 6.9 step-down transformer in the Groton-Long Point high-voltage substation? *A* The same answer as regards the line.

Mr. Wahrenbrock: Mr. Examiner, it will appear from other evidence in the record what the exact dates are. I would like then to frame my question this way, if I may:

By Mr. Wahrenbrock: *Q* With reference to the parts of the 33 k. v. transmission line and the 33 k. v. to 6.9 k. v. step-down transformer and appurtenant equipment in the Groton-Long Point high-voltage substation, which were owned or operated by The Connecticut Light and Power Company during the period from August 25, 1939 to February 28th, 1941, will you state whether, in your opinion as an engineer, those were facilities for the transmission of electric energy which was transmitted from the State of Connecticut and consumed in the State of New York by persons other than the transmitter thereof?

[*1691*] Mr. Branch: I have several objections to that question, in addition to the very general ones which I specified and which I will not argue at length here.

There are two. If I understood the question correctly, it assumed that certain facilities—and I am thinking specifically of transformers at the Groton-Long Point substation, there may have been others—were owned by The Connecticut Light and Power Company up to some time in February, 1941. The evidence is directly to the contrary on that, so there is an assumption of fact that is incorrect.

I am picking that one out as I think it may be one of the clear-

est, although I think there are other assumptions in regards to dates of ownership that are incorrect.

Also, this matter of bringing in the language of the Act "consumed by a person other than the transmitter" is, I think, improper, and I object to the question on that ground as well.

Trial Examiner: It does not seem to make an awful lot of difference whether you say "a person other than the transmitter", or to say that is done by the transmitter. It seems to me that the first question you raise, the merit of it, depends upon the understanding of the word "during". It seems to me that the word "during" doesn't necessarily mean during all of the period. Perhaps that question might be cleared up by an amplification of the question by Commission's counsel.

[*1692*] Mr. Wahrenbrock: My intention was, and I believe it was obvious, to mean by "during", if that is the word I used, "during such time as it may have been owned or operated", as the facilities may have been owned or operated by The Connecticut Light and Power Company. The question does not assume ownership. By my preliminary statement I expressly indicated that that would be settled by other evidence in the record, and with respect to the second point "consumed by a person other than the transmitter", I suppose that by circumlocutions I could find other language that would say the same thing. I might even express it in Gaelic, but the mere fact that we avoid certain English words which happen to be used in the statute, has no virtue, I submit.

Mr. Branch: I submit it is very leading. It does not appear that the word "transmitter" means who transmitted, or what this witness understands by "transmitter". There is a perfectly proper way of getting at this if Mr. Wahrenbrock wishes to, and I object to this form of question.

Trial Examiner: I see no particular reason why Commission's counsel may not follow his own choice in the matter of language. If there is any question about it, the respondent may bring out that

fact in cross examination. The witness may answer the question. The objection is overruled.

The Witness: May I have the question?

[*1693*] Mr. Wahrenbrock: Before the question is read, Mr. Examiner, and bearing on the objection that has been raised and overruled, but for the sake of clarity of those who read the record at this point, I wish to refer to page 357 of the transcript where Mr. Tiffany's testimony has fixed the date of transfer of title of the transformers in question from The Connecticut Light and Power Company to the Borough of Groton, as being June 15th, 1937.

Trial Examiner: All right, you may proceed with the reading of the question to the witness.

(Question read by the reporter.)

A Yes.

By Mr. Wahrenbrock: *Q* Will you describe more fully the part performed by the step-up transformers connected to the generator buses in Connecticut and the step-down transformers in the Borough of Groton and the Borough of Groton-Long Point, so far as the supply of electric energy to Fishers Island was concerned? *A* The supply of energy for Fishers Island being remote, a 33 k.v. transmission line was made use of to transmit the energy to the Groton-Long Point high-voltage substation near the take-off point of the submarine cable, and step-down transformer to step the line-voltage down at Groton-Long Point high-voltage substation to a value suitable for the submarine cable, namely 6.9 k.v.

[*1694*] The balance of the transmission was accomplished by a short length of overhead line partly in cable and the submarine cable itself.

The final stepdown to reduce the 6.9 k.v. to a suitable voltage for local consumption occurred in 6.9 k.v. to 2.3 k.v. transformers on Fishers Island at the location in which the 2.3 k.v. local distribution was accomplished.

Mr. Wahrenbrock: Before continuing, Mr. Examiner, my attention is called—

Trial Examiner: Did that complete your answer to the question, Mr. Thomas?

The Witness: Yes.

Trial Examiner: All right.

Mr. Wahrenbrock: My attention has been called to page 366 of the transcript and 367 where the date of the transfer of title to the transformers in the Groton-Long Point high-voltage substation is further dealt with. I believe that is the matter that Mr. Branch had in mind in his last statement.

Mr. Branch: And is it not true that the date which you gave, which I think was mentioned by Mr. Tiffany originally, turned out to be incorrect?

Mr. Wahrenbrock: He fixes the date in line 8 on page 367 as November 15th, 1935.

Mr. Branch: 1935, yes.

By Mr. Wahrenbrock: [*1695*] *Q* Mr. Thomas, what are the approximate energy losses in such transformers, under normal operating conditions? *A* Similar to those of the other power transformers, that is, negligible.

Q Directing your attention to the transformers to which you have referred in your description of the transmission facilities by which the East Hampton District of The Connecticut Light and Power Company is served, or was served, prior to July 1, 1939, and by which Fishers Island was served, prior to February 9, 1941, will you explain their functions? *A* To transmit, transfer or convey electric energy from the primary to the secondary circuits,—the energy is received at the primary voltage and delivered at the secondary voltage. The number of turns in series in the primary winding is adjusted to the transmission voltage and the number of turns in series in the secondary winding to the secondary voltage. These transfers are practically instantaneous, with very small losses. I speak of these losses sometimes as negligible, sometimes as of the order of 2 per cent.

I would like to explain that while they are very small and do

not affect operations in bulk, they are not so small that the designer of the transformer does not take account of them.

Q What is the—

Mr. Wahrenbrock: I believe you have just covered that.

[*1696*] *Q* Do these transformers have core losses? *A* Yes.

Q Will you explain the core losses in general terms? *A* As I have already stated, every operating transformer must have its core excited, that is, impressed with alternating magnetism. It appears as a matter of experience that such alternating magnetism cannot exist without a cetrain waste of energy within the core itself, and this is what I have in mind by core losses.

Q Aside from the losses to which you have referred, is there any difference between the amount of electric energy which enters each of these transformers and the amount which leaves it? *A* No, excluding the exciting energy supplied through the primary winding.

Q How much does that exciting energy amount to? *A* Substantially negligible, perhaps of the order of 1 per cent of the output, full output, of the transformer.

Q Is it possible for any different amount of electric energy to enter the primary coil of any of such transformers than that which leaves the secondary coil, aside from such relatively small transformer losses and exciting energy?

* * * * * * [*1698*]

A No.

* * * * * * [*1699*]

Q Is there any appreciable delay or difference between the time electric energy enters any of those transformers and the time it leaves it, neglecting exciting energy? *A* No.

Q Is it possible for electric energy to leave any of those transformers at any substantially different time than it enters it in any commercial quantity, excluding the exciting energy? *A* No.

Q Is any of the electric energy which enters any of those transformers ever stored for anything more than a very small fraction

of a second at most, excluding exciting energy? *A* No. The energy stored in the core, however, goes in and out twice every cycle, that is, every sixtieth of a second.

Q Would the storing of electric energy for any substantial period of time be possible in a transformer? *A* No.

Q Will you explain what differences there are, if any, between the primaries and secondaries of those transformers in voltage and current, in normal operation? *A* Taken turn by turn, and neglecting the excitation of the core and losses, there is no difference between primary and secondary. I wish to state that this answer is made in terms of the simplified transformer that I have described at [*1700*] some length. That is, instead of considering the large coils of commercial transformers, I have dealt with single turns, all having the same voltage per turns. Primary turns have applied and counter e.m.f., and secondary turns only counter e.m.f. The current in the primary turns passes around the core in a direction opposite to the current in the secondary turns, all as so far described. When now the commeicral transformers are considered, such as those constituting facilities for the transmission of electric energy about which I have testified, some simplification can be made, in that, where several turns are connected in parallel to get a larger current capacity, there is no necessity for using separate turns of wire, and a single larger wire is usually substituted. This use of a heavy wire in some coils usually occurs in the low tension windings. The balance of the primary current and secondary current then becomes the balance of the current multiplied by the number of turns in the two windings. In this, the effect of the exciting current is ignored.

The above statements apply to all power transformers, including those about which I have testified in this case.

Q In the last series of questions which I have put to you about the transformers at Groton and the transformers at and near East Hampton, my questions have been sometimes in the present tense. Would what you have said apply equally to those transformers as

of the time of their operation as pre- [*1701*] viously fixed in the testimony? *A* It would.

Q Mr. Thomas, in order that the statements which you made about some of the facilities at Winsted may be clearly understood, will you state the time as of which your study was made with reference to those facilities, and if you made a field trip, and your study was made on observations on that field trip, will you indicate the dates of that field inspection. *A* I did make such a field inspection in the latter part of May, this spring.

Trial Examiner: In 1941, you mean?

The Witness: Yes. The answers cover a period as long as facilities have been the same, including the period covered by Mr. Miller's studies, except when otherwise specifically shown in questions or answers.

Mr. Wahrenbrock: That concludes my examination of Mr. Thomas on direct.

Trial Examiner: Before the cross-examination starts, there is one point I would like to clear up.

I think the witness testified that the energy was current times electro-motive force; is that correct?

The Witness: Yes, considering instantaneous conditions. If you are going to use that expression in a general sense, we have to remember that conventions have been adopted to [*1702*] simplify the handling of the alternating currents which are always changing, to get some figure which would represent something which doesn't change, as long as the current and voltage don't change, so-called effective values. Now, when you multiply effective electro-motive force by effective current, you have to take into account what is called power factor, and power factor is a factor ranging from zero to one, resulting from the fact that we have taken a special convention as to what this effective current and voltage means. It has to do with the relation of the exciting current in the system to the work current in the system.

Trial Examiner: In the case of an intervention of a transformer,

is the product of the current times the electro-motive force on the primary side approximately equal to the product of the current and the electro-motive force on the secondary side?

The Witness: That is true, if you ignore the exciting current. That is an enabling facility, you may say, which has to be there before it will operate. Otherwise, it is the same.

Trial Examiner: And that exciting current is transformer losses?

The Witness: Part of it. In addition there is heat losses which must be added to the exciting losses.

Trial Examiner: Since those are losses, then I presume that the secondary side is always less than the primary side. [*1703*] Is that correct?

The Witness: That is right.

* * * * * *

HAROLD E. MILLER,

previously sworn, resumed his testimony:

Cross Examination by Mr. BRANCH.

* * * * * * [*1738*]

Q I will put it another way. There are 21 days shown in Exhibit No. 61, are there not? *A* Yes.

Q And you finally confined your studies, as shown in the exhibit, to those 21 days, didn't you? *A* That is right.

Q And those 21 days were selected from 321 days, as to which you had given some attention, were they not? *A* Yes, they were selected from the 321 days.

Q Why the hesitation? Is there any doubt about that? *A* No. Merely that in my testimony, I had stated that I had an intermediate step, where I had secured the information on 34 days, and my process of elimination proceeded from 321 days to 34 days to 21 days, and I wanted to make sure that my answer was correct.

Q Mr. Miller, what were the 34 days that you selected from the 321 days? Will you give us those days? *A* The days?

Q Yes. *A* I haven't got my notes here. If I could get the Connecticut Valley Power Exchange log sheets, I can call them off to you from my notes.

[*1739*] Trial Examiner: We will have a recess for five minutes.

(At this point a short recess was taken, after which the hearing was resumed.)

Trial Examiner: The hearing will now be in order.

By Mr. Branch: *Q* Mr. Miller, isn't it a fact that before you came up here in May, 1941, you or someone working with you, or at your direction, had gathered elaborate statistics as to 34 different days? *A* 34 different days?

Q I should say 24 different days. *A* Yes. From the results of my first investigation, in August, 1940, I gathered information about certain days, and request was made, I believe, of The Connecticut Power Company, The Connecticut Light and Power Company, and the Torrington Electric Light Company for certain information which I intended at that time to use, but in view of the more recent field trip, I decided not to use that information.

Q Well, the fact is that as early as February, 1941, you had gotten a great deal of detailed information, including log sheets from several different places relating to 24 different days, hadn't you? *A* I had.

Q And you had picked out those 24 different days as a result of studies which you had made before that time, hadn't [*1740*] you? *A* I picked those days out as a result of the field trip I had made in August of 1940.

Q Yes, and you picked them out because you thought they were days as to which you could prove something significant, didn't you? *A* Yes.

Q I mean, you didn't just take them at random? *A* No.

Q As a result of this field trip and the investigations which you had made in August, 1940, you had selected certain days which looked to you as though they might give the best type of result for which you were looking, hadn't you?

Mr. Wahrenbrock: Mr. Examiner, in view of the testimony that has gone, I don't see the relevance or competence of examination with respect to studies previously made and concerning which testimony has not been put in.

Trial Examiner: The testimony may be relevant. The relevance does not fully appear. However, we will permit counsel to proceed with the present line of questions. You may answer the question.

The Witness: May I have the question read?

Trial Examiner: Will you read the question, Mr. Reporter?

(Whereupon the last question as above recorded, was read by the reporter.)

[*1741*] By Mr. Branch: *Q* There isn't any doubt about that, is there, Mr. Miller? *A* I wouldn't say the best type of information. I think as I recall I selected those days as indicating that The Connecticut Light and Power Company was the owner and operator of facilities for the transmission of sale at wholesale—well, in the case of those days I won't say "sale at wholesale" but for the transmission of the electric energy which was transmitted from a State and consumed outside that State.

Q And as a matter of fact, in your final studies as embodied in Exhibits 61 and 62, you have used only four of those 24 days originally selected. That is correct, isn't it? *A* To be truthful, I did not know until you just stated it that I had used any of those days.

Q You didn't know that you had used any of them, but after you studied the material that was gathered in relation to those 24 days, didn't you? *A* I did.

Q And then a postponement of this matter was asked for by the Commission in order for you to make this field trip in May, wasn't it?

Mr. Wahrenbrock: Mr. Examiner, I object to matters going outside—

* * * * * * [*1744*]

The Witness: I don't know the reasons for the postponements of the hearing.

By Mr. Branch: *Q* Well, you didn't have these studies of these 21 days made until after your field trip in May, 1941, did you, Mr. Miller? *A* As I previously stated, these days were obtained as a result of a field trip of May, 1941.

Q Yes, but you had made studies of certain other days a month before that, hadn't you? *A* Yes, sir.

Q And then you started on some new days when you came in May, 1940? *A* May, 1941.

Q 1940. *A* My field trip of August 19—

Q Can't you answer that yes or no? *A* I have got to answer the question so as to make some sense to the question. My field trip of August, 1940 was necessarily limited for the period prior to August, 1940. [*1745*] That left the question of operations of the Company between August, 1940 and the time of the hearing as a matter of which I would have no knowledge, and since it was necessary for me to get this additional information, I decided to review the whole picture, and that is why I made a fresh start.

Q You discarded the studies that you had made of this 24 days previous? *A* Yes, because the new start was comprehensive enough that any information obtained in the previous study would be contained in this new study.

Q Mr. Miller, you say that you picked out 321 days. Am I correct in assuming that you studied the entire period from January 1, 1937 to May 26th, 1941, when you picked out these days? *A* Exclusive of a period around the hurricane of 1938.

Q Yes. And will you just make some calculations roughly and see if I am correct? Your studies covered then a period of more than 1,600 days, did they not? *A* It appears to work out to 1,601 days.

Q 1,601 days that your study covered. Now, did you make any effort to find out how many of those days there were in which there was no possibility, according to your theory, that Massachusetts power went to any of the plants of the Connecticut [*1746*] Light and Power Company, with which you are concerned? *A* I made no effort to determine that.

Q You were not endeavoring to make a study that would give a comprehensive or complete picture of the situation?

Mr. Wahrenbrock: Mr. Examiner, I object to that question.

Trial Examiner: I think that is a—

Mr. Wahrenbrock: The witness has stated the purpose for which he made the study. It is not material or relevant to characterize it as being lacking in comprehensiveness because it doesn't do something that some other study might do.

Trial Examiner: Well, I think that we better have an explanation of what he meant by "comprehensive". It depends on what purpose it is comprehensive for.

Mr. Branch: I will clarify that, sir.

By Mr. Branch: *Q* You made no effort then to determine what portion of the time the plants of The Connecticut Light and Power Company were supplied entirely with Connecticut energy, according to your theory? *A* No, I made no attempt to determine the number of days or the period of time when The Connecticut Light and Power Company was being supplied with energy generated in Connecticut.

Q Your studies, however, made it perfectly apparent that a very large proportion of the time that was the situation, didn't it, according to your theory? [1747] *A* I had not considered that.

Mr. Branch: Will you read the answer, please? We couldn't hear it on account of the train.

Trial Examiner: The answer will be read by the reporter.

(Answer read by the reporter.)

By Mr. Branch: Well, you know that is so, don't you, Mr. Miller? *A* I don't know that it is so.

Q Isn't it a fact that in going over these log sheets you found day after day that didn't have even the elements of a situation that you would have to consider, in order to get Massachusetts power into these plants under your theory?

Mr. Wahrenbrock: Mr. Examiner, the witness's direct examination showed how he selected these 321 days, and the two or more

factors for which he looked. Now, if those are the elements that he referred to, the question may be understood. If there are other elements that are referred to, I confess that the slight acquaintance that I have been able to obtain of this matter, leaves me completely mystified as to what those elements referred to by Mr. Branch's question might possibly be.

Trial Examiner: If the witness can answer, he may.

The Witness: May I have the question read, please?

Trial Examiner: Will the reporter read the question to the witness?

(The question is read.)

[*1748*] *A* Yes, I found many days when no energy was being received at South Meadow from the plants in Massachusetts.

[*1749*] By Mr. Branch: *Q* As a matter of fact, that was the situation the vast majority of the time, wasn't it? *A* I don't recall.

Q Well, then, I take it you were not interested in trying to pick out days that were typical? *A* What do you mean by typical?

Mr. Wahrenbrock: Mr. Examiner—

By Mr. Branch: *Q* Typical of the usual situation.

Trial Examiner: I think with that explanation it is clear. I think that satisfies the question that you might raise.

Mr. Wahrenbrock: There is no showing that there is a single usual situation, Mr. Examiner. The fact is the evidence about the operation of the Connecticut Valley Power Exchange shows that typically there is no single typical situation with respect to the flow of power.

Mr. Branch: May I say this, Mr. Examiner. Under the practice with which I am familiar, and the gentlemen from Connecticut say it is the same, counsel are not permitted to make these statements in the course of cross-examination. If this thing is to continue this way, and statements can be made, I think the purpose and effect of cross-examination may be seriously interfered with. I request the Examiner to pro- [*1750*] tect me in that respect.

Trial Examiner: I think there has been something of that on

both sides, Mr. Branch. I see no reason for finding any fault with the right of counsel to ask a question. How far the question is relevant will be a matter for future determination. You may proceed.

The Witness: I would say the days I have selected are typical of operations that occur and recur frequently in the operations of the Connecticut Power Company, the Connecticut Valley Power Exchange, and the connections The Connecticut Light and Power Company had along the CP lines with The Connecticut Power Company.

By Mr. Branch: *Q* Well, I asked you whether you endeavored, in picking out these days, to pick out days that depicted situations that might be regarded as typical of all operations. At least, that is what I will ask you now. *A* I endeavored to pick out days when, as I have stated before, the operations were normal. By that I mean that there was no indication on any of the log sheets or other information that I received that indicated that there was anything unusual or abnormal about the operations, and I was only interested in picking out the days under those conditions when Massachusetts energy was being received at South Meadow and Falls Village [*1751*] generation was zero or less than the delivery to the Central Hudson Gas and Electric Corporation.

Q And those conditions obtained during a rather small proportion of the time, didn't they? *A* I don't know how to characterize—how you would characterize operations that occur during 321 days out of 1600 days as being particularly small.

Q During how many hours of the 321 days that you selected did those conditions obtain? *A* I haven't got the figures in front of me. I can't give you that.

Q You have them, I suppose, available? *A* I would have to work them up.

Q I say, you have them available somewhere here in Hartford? *A* I have got my notes here.

* * * * * * [*1756*]

Q Now, sir, I turn to your testimony, and this is, as I under-

stand it, your answer in regard to the 321 days, and I ask you, is this the correct explanation of the method of selecting the 321 days?

"They were days which contained hours"—I am not attempting to read this verbatim, but is it substantially correct? "When the generation at Falls Village was zero or less than the delivery to the Central Hudson Gas and Electric Company, and simultaneously there was receipt at South Meadow of electric energy from Massachusetts." *A* That is correct.

Q That is correct. Now, the generation at Falls Village wasn't zero if there was high water, was it? I mean, if there was high water, Falls Village was generating generally, wasn't it? *A* Well, Falls Village—I don't know how much storage it has, but I imagine rather than to spill, the Falls Village plant would generate.

Q And if it were periods when it was spilling, it would be generating at a pretty high rate, wouldn't it? *A* Well, the plant there has a generative—can generate apparently over 10,000 kilowatts.

Q Yes. [*1757*] *A* So that, if it was generating at full load, it would be generating over 10,000 kilowatts.

Q And did you make any study to enable you to determine whether these periods which, according to your calculations, were periods in which Massachusetts energy came over the Connecticut lines, were periods of high water? *A* Where?

Q The plants on the Connecticut River. *A* Well, in order for the plants in Massachusetts to generate, I believe most of them are on the Connecticut River, there must have been water or they wouldn't have generated.

Q The point is that it is a comparatively rare situation when Falls Village generation is at zero, and where those plants in Massachusetts have surplus water, isn't it? *A* I wouldn't call it rare.

Q Well, isn't it a fact that if one river is high, another river a few miles away is also likely to be high?

Mr. Wahrenbrock: Mr. Examiner, that calls for a conclusion that I think the witness has not been—

Trial Examiner: I think the witness has stated he doesn't know. It seems to me that that calls for a pretty intimate knowledge of geography and rainfall set-up of New England, and the witness has not shown he is familiar with it. He says he doesn't know.

By Mr. Branch: [*1758*] *Q* Did you make any effort to ascertain at what particular times the plants in Massachusetts on the Connecticut River did have—or the tributaries of the Connecticut River—did have surplus water? *A* No.

[*1759*] *Q* Then I take it you made no effort to determine whether the kind of situation to which you directed your attention was a common one or one which existed only when several different elements existed simultaneously. *A* I made an effort only to determine the facts, and I have stated the method I went about to obtain those facts, and if I were to start to enter into matters beyond the facts necessary to establish whether or not Massachusetts energy was delivered to The Connecticut Light and Power Company, there would be no end to it.

Q Well, let me say this, then. You are interested only in times when generation at Falls Village was little or nothing, which coincided with times when, according to your theory, there was receipt at South Meadow, of electric energy from Massachusetts—is that correct? *A* That is not correct.

Q Well, none of the days that you selected were days on which any other situation obtained, were they? *A* Yes.

Q Didn't you say that the 321 days that you selected were all days when the generation at Falls Village was zero or less than the delivery at the Central Hudson Gas and Electric Corporation and simultaneously there was receipt at South Meadow of electric energy from Massachusetts? *A* I did say that.

[*1760*] *Q* Well then, what is the difference between those two, sir? *A* You stated that I had said that I had only considered days when the generation at Falls Village was little or nothing. That is not correct.

Q What was the Falls Village capacity for generation? *A* I

think it has a nominal capacity of about 9,000, but it seems to me it generates as high as 10,500 or even slightly higher than that.

Q Did you consider any times when Falls Village plant was generating at capacity? *A* Yes, sir.

Q How many of the hours that are shown in Exhibit 61 are hours when Falls Village was generating at capacity?

Mr. Wahrenbrock: May the witness refer to Exhibit 61?

Trial Examiner: I think the witness may, if he desires. It is up to him to ask for those things. It is not for counsel to raise the question.

The Witness: I was just going to ask.

Trial Examiner: If the witness desires to refresh his mind he may be supplied with a copy of the exhibit. Let him examine my copy.

(Copy of exhibit is handed to the witness.)

Mr. Wahrenbrock: Mr. Examiner, while the witness is looking, may I have the pending question read by the reporter?

[*1761*] Trial Examiner: You may. The question will be read for the benefit of Commission counsel by the reporter.

(Question read by the reporter.)

A Mr. Examiner, before proceeding to do any further work on this, it has occurred to me that the question of what generation should be considered full capacity is rather difficult for me to answer, and if Mr. Branch could limit the figures on generation between certain values, I would be better able to answer the question.

By Mr. Branch: *Q* Well, you said it was rated at 9,000, but could generate more; isn't that right? *A* Yes.

Q Take 9,000. *A* As I understand the question, I am to consider only the hours given on these tables.

Trial Examiner: It is the hours that appear in the exhibit, and as I understand the limitation added by counsel, it is on which 9,000 or more is generated.

By Mr. Branch: *Q* Yes. And you can shorten it. Just pick out

the number of days there were in which 9,000 or more were generated at any hour. *A* Oh, on eight of those days shown in this table the generation at Falls Village exceeded during some hours, 9,000 [*1762*] kilowatts.

* * * * * * [*1771*]

Q Is it true that all or substantially all of the hours which are shown in these exhibits, 61 and 62, represent only one particular combination of operating conditions? [*1772*] *A* No.

Q Is it not true that all or practically all of the hours shown on these exhibits were hours at which there was a small demand on The Connecticut Light and Power Company's plants, with which we are interested. Of course I refer to Winsted, East Hampton and Bristol. *A* No.

Q I direct your attention to Exhibit 61. That day was a Sunday, was it not, the first day there, May 2nd? *A* Yes, sir.

Q And the loads on Sundays are very much less than on week days, are they not? *A* Yes, that is true.

Q So it is true that on that day each of the hours shown here represents a time when there was a light load. That is true, is it not? *A* For Sunday, May 2nd, 1937, that is true.

* * * * * * [*1773*]

Q Now, I am confining the questions, for the time being, [*1774*] to those situations which you represent by letters A. C, E or I, and I direct your attention to the sheet for Wednesday, May 12th, 1937. The only hours in categories A, C, E or I on that day were for 3:00 to 7:00 A.M., were they not? *A* That is all the table shows.

* * * * * * [*1775*]

Q The loads at those times of day are very light as compared to other times of day, are they not, Mr. Miller? *A* I would say they are light. I don't particularly think that there is anything extreme about them. They are just light, as compared to other hours of the working day.

Q Well, isn't it a matter of fact that anybody knows that there

is very much less demand for power except under unusual circumstances, between 3:00 o'clock and 7:00 o'clock in the morning than at other times of the day? *A* There is usually less demand. I wouldn't characterize it by saying "very much less". There is less demand.

Q You are not willing to say that it is very much less? *A* No.

Q In 1937, I am not talking about the time when the factories were working nights, but ordinary times. *A* Even here you have 5,000 kilowatt-hours delivered to Bristol during four of those hours, and 6,000 during the hour ending 3:00 A.M., and a maximum is shown on that table for that day which is around 2:00 or 3:00 in the afternoon, of 12,000. That ratio is not extreme, by any means.

[*1776*] *Q* Less than half, isn't it? *A* Just about half, 6,000 to 12,000 is just about half.

Q You wouldn't call that very light? It runs from 5,000 to 12,000. Most of the hours at Bristol are 5,000, not 6,000. *A* Yes, and only two of the hours are 12,000.

Q Well, characterizing that as you want, the only hours which are in the categories A, C, E or I on that day are those hours from 3:00 to 7:00 A.M., are they not? *A* That is true.

Q Now, turning over to the next sheet, Tuesday, June 1st, the only hours on that day which are shown as in those categories are the hours from 1:00 to 7:00, are they not? *A* That is right.

Q And the deliveries to Bristol during those times ran from 2,000 to 4,000 as contrasted to a maximum of 13,000 as shown on that day, did they not? *A* That is right.

Q The next day that was shown is Monday, July 5, which is a holiday, is that not correct? *A* That is correct.

Q And it appears that at that time the loads at Bristol were 3,000 or less throughout the hours shown there, does it not? *A* That is correct.

Q On the next sheet, which is Friday, May 13th, there [*1777*] is no hour that is within the categories that we are speaking of, is there? *A* No A, C, E, and I.

Q The next day which we are speaking about in your exhibit, which is 61, is Monday, May 30, which again is a holiday, is it not? *A* That is correct.

Q And even so, the only hours of that day which are shown in your Exhibit 61 are the hours from 4:00 to 9:00 A.M., are they not? *A* Showing flow condition A.

Q Yes, sir. The load at Bristol—

Mr. Wahrenbrock: I will have to protest the continuance of this process which is now in its second repetition of going through this twenty-one page table, and picking out little elements of it, and trying to give them a disproportionate emphasis instead of letting the table rest for how it speaks.

Trial Examiner: The table will speak for itself, in any event. Then counsel may proceed with the cross-examination. The objection is overruled.

Mr. Wahrenbrock: It is just a process of reading what is already in the record and it takes time and costs money.

Trial Examiner: However, we will permit it for the present.

By Mr. Branch: *Q* The next day is May 30th, 1938, which I think I covered.

[1778] Trial Examiner: You discussed that.

By Mr. Branch: *Q* And the next day is Monday, August 1st, 1938, is it not? *A* Yes, sir.

Q And the only hours on that day which come within the categories which we speak of are the hours of 1:00 to 6:00 A.M., or rather, 2:00 to 6:00 A.M., are they not? *A* That is right.

Q And the load at Bristol was 2,000 or less during each of those hours, as contrasted with a high on the day of 10,000, was it not? *A* That is right.

Q Without going through the rest of these, Mr. Miller, are you now willing to concede that all of the hours that fall in these categories were hours of light load?

Mr. Wahrenbrock: Same objection, Mr. Examiner.

A Not without going through all. I haven't gone through these tables with that thought in mind, and I don't want to.

Trial Examiner: That is with regard to A. C. E and I, isn't it?

Mr. Branch: Yes, sir.

* * * * * * [1789]

Q Now, in general, did you not find, Mr. Miller, that on the days which you selected, conditions varied from hour to hour, that is, you had to put into different categories different hours on the same day? *A* Yes, although there were many instances of the same conditions applying over a series of hours.

Q But speaking by and large, even on these days which you selected, there were some days or there were some hours of each of the days when according to your theories the energy supplied was pure Connecticut energy, is that correct? [1790] *A* The tables don't indicate that.

Q What did you say? *A* The tables don't indicate that.

Q Do not indicate that there were changes from hour to hour? *A* That wasn't your question.

Mr. Branch: Will you read the question, please?

Trial Examiner: Read the question back for the benefit of counsel.

(The question is read by the reporter.)

By Mr. Branch: *Q* You say the tables don't indicate that? Now, isn't it true that you haven't indicated any hour during this entire period of two and a half years where there was Connecticut energy purely? *A* The tables do not show any instance of pure Connecticut energy as being delivered to all the points.

Q Now, Mr. Miller, let's be open about this. Isn't it a fact that when you did come to pure Connecticut energy you just dropped that out?

Mr. Wahrenbrock: Mr. Examiner, I object to the implication. We have been entirely open from the beginning, and the testimony of the witness on direct examination was explicit that he was showing instances when Massachusetts energy reached here.

Trial Examiner: I think the purpose of that is clear. I [1791] don't think there is any inference of concealment, and I think that perhaps the suggestion in counsel's question is rather unfair.

Mr. Branch: Well, I will leave that out, Mr. Miller.

By Mr. Branch: *Q* Isn't it a fact that if you did find an hour when there was what you considered pure Connecticut energy, you dropped that? You not only didn't show that on the chart, but you also eliminated it from the table for the day?

Mr. Wahrenbrock: Mr. Examiner, may the question be directed to the particular points that respondent's counsel had in mind? There are at least three points that are significant, and it is not clear from the question whether he means to ask with reference to all three, or with reference to some particular one or two.

Mr. Branch: With reference to all three.

Trial Examiner: The witness may answer.

A If, during any hour of a day shown in this table, Exhibit 61, none of the flow diagrams I have prepared in Exhibit 62 applied, I omitted that hour, because I wished to tie the table and the flow diagrams together.

By Mr. Branch: *Q* And the flow diagrams, none of them, of course, does show any day when there was pure Connecticut power, or any hour when there was pure Connecticut power received in all three [*1792*] of these places? That is correct, isn't it? *A* That is correct.

* * * * * * [*1797*]

Q Well, there wasn't any meter or group of meters at Winsted which showed where the energy came from, or was there? *A* Yes. There was a meter, not at Winsted—at Torrington there was a meter, at Torrington, which indicated that the Winsted district received energy from the Torrington Electric Light Company.

Q But it didn't show anything as to where that Torrington energy came from, did it? *A* That meter by itself, no.

Q And, of course, there wasn't anything at Winsted that showed whether energy came from Massachusetts or Connecticut was there? *A* As far as I know, there was no meter at Winsted.

[*1798*] *Q* Well, then, the answer is no? *A* No.

Q There wasn't any meter at Bristol, or a group of meters at Bristol that showed what State the energy came from, was there? *A* By itself, no.

Q And there wasn't any meter or group of meters at East Hampton, or in that district, whatever you want to call it, Portland to Middletown, that showed what State the energy came from, was there? *A* No meter which indicated where the energy came from.

Q And, of course, the current is in no way different in any way that can be observed, whether the energy came from one State or another State, is there? *A* Electric energy generated in whatever State is electric energy.

Q Yes, and it is all just the same, isn't it? *A* Electric energy is the same, yes.

Q And there is no way of identifying the source of energy from observing the energy or measuring the energy at a particular point, is there? *A* That is not true, Mr. Branch. At South Meadow substation there is a combination of meters that do enable you to determine whether energy from Massachusetts is delivered to the CP lines.

[1799] *Q* But you have explained how you used those. I wasn't referring to that. But there isn't any meter at any one of our points that would enable any one of our men, by looking at it or observing it, to know where the energy came from, is there? *A* There is no meter at any one of your points that your men could determine by looking at where the energy came from.

Q No. And in order to ascertain where that energy came from, you felt it necessary to make the elaborate studies which you have described, did you not?

Mr. Wahrenbrock: Mr. Examiner, "the studies which the witness has described" is ambiguous, because he has described, as his cross-examination has brought out, at least two studies, one of which was superseded by a further study.

Trial Examiner: I understood counsel to mean Exhibits 61 and 62.

Mr. Branch: Yes, sir.

Trial Examiner: That is what you mean. With that understanding, the witness may answer the question.

The Witness: Except I wouldn't want to characterize the studies as being elaborate. I made such studies as enabled me to present the facts, as was done in my testimony and in the Exhibits 61 and 62.

Mr. Branch: *Q* Now, these studies are all predicated upon certain [*1800*] principles which you assumed, are they not, Mr. Miller? *A* You do not mean by the word that I have "assumed" that I originated them, do you? I mean, I just want to clear up the term.

Q I will ask you whether you did originate any principles? *A* I did not originate any principles.

Q All right. Is it true that the validity of your results as embodied in the studies, is necessarily dependent upon the correctness of this principle?

Mr. Wahrenbrock: I am sorry, I didn't hear. The correctness of what?

Trial Examiner: I believe the last word was—

Mr. Branch: "principle", I said.

Trial Examiner: Then I don't know yet. You referred principles a while ago.

Mr. Branch: Let me rephrase my question.

By Mr. Branch: *Q* It is true, is it not, that the validity of your conclusions as expressed in the flow diagrams, and which are Exhibit 62, and in the study which is Exhibit 61, is dependent upon the correctness of this theory that if a conductor is carrying energy in one direction, there can be no flow of energy in the reverse direction? *A* I think you should modify that to some extent, at least. [*1801*] The statement is correct if you modify it to speak of conductors of the type we are dealing with, such as transmission lines of the CP company and the buses at South Meadow, and the lines of The Connecticut Light and Power Company, and

The Torrington Electric Light Company. I think that statement is correct.

Q Now, Mr. Miller, up to the time you came to the Federal Power Commission, did you have occasion to make studies or prepare diagrams of the kind as shown by Exhibits 61 and 62? *A* I did not.

Q None of the work that you had up to that time called for any studies of that kind on your part, did they? *A* None of the work I had before required me to make flow diagrams similar to Exhibit 62 or the tables similar to Exhibit 61.

* * * * * * [*1802*]

Q Now, have you made up diagrams or studies similar to the one you made for this case, in other cases? *A* I have made tables rather more comprehensive. I won't say more comprehensive, but more detailed than are shown here, in connection with the Ohio Public Service case. I did not prepare any flow diagrams. As I say, I assisted Mr. Woll in some of the tables he prepared for The Hartford Electric Light Company, and those cases are the only cases with which I have been connected.

Q Is it correct to say your experience in this kind of studies, and in preparing this kind of diagrams and tables, is limited to the Ohio Public Service case, this case, and some assistance which you rendered to Mr. Woll in The Hartford Electric Light Company case? *A* That is true, as far as formal proceedings are concerned My work requires me to prepare information concerning the operations of utilities. I described my general duties [*1803*] when I was on direct examination. And the preparation of information of that kind is quite similar, although it doesn't have to be put in quite as formal a fashion as the information required for the preparation of the tables in Exhibit No. 61, or the flow diagrams in Exhibit No. 62.

* * * * * *

Q Mr. Miller, is it true that never until May of this year did you prepare flow diagrams similar to the ones which are presented

in Exhibit 62 in any case? *A* No, I never prepared flow diagrams similar to these for any case. The necessity of preparing a flow diagram will depend on whether a flow diagram need be prepared for a case.

Q Now, none of the studies as to these days which are illustrated by the flow diagram or by Exhibit 61, show any energy, according to your theory, coming from New York, do they? *A* No.

* * * * * * [*1809*]

Q Well, now, you have gone through elaborate studies in order to trace what you say is Massachusetts energy in Connecticut. Where was that Massachusetts energy which you, on your theory, traced in Connecticut, generated? *A* I did not make a detailed study of the sources of the energy transmitted from Massachusetts. I am aware there are plants of the Western Massachusetts group up in Massachusetts that supply hydro-electric energy to the Turners Falls Power and Electric Company. I am aware that Turners Falls has their connections with the New England Power. For my pur- [*1810*] poses, it was only necessary for me to determine from the record whether energy was transmitted from Massachusetts and consumed in Connecticut. And I can make this further statement, I am not aware of any line of the Western Massachusetts company which is connected to Connecticut sources of energy supply except the Hartford-Agawam line.

* * * * * * [*1820*]

Q Mr. Miller, did you make any study to ascertain what part of the electric energy which under your theory was supplied to these three plants of The Connecticut Light and Power Company at Bristol, Winsted and at East Hampton, was supplied by power from Connecticut and what percentage by power from Massachusetts under your theory?

Mr. Wahrenbrock: May I have the question read, please?

Trial Examiner: The question will be read for the benefit of Commission's counsel.

(Question read by the reporter.)

Mr. Wahrenbrock: Mr. Examiner, I object to the question as being ambiguous, whether it refers to any particular hour, or whether it refers to all the hours in the aggregate.

Mr. Branch: I said any study—I don't know how the question could be broader. I think I made it as to any study.

Trial Examiner: The witness may answer.

A I have considered the question of percentage of Massachusetts energy delivered to Winsted, Bristol and East [*1821*] Hampton during the hours shown on this table, and, as I have stated before, during the hours illustrated by flow diagrams A—

Mr. Branch: Well, that answers my question.

Trial Examiner: You may proceed.

By Mr. Branch: *Q* Except now I ask you have you made any other study to determine those percentages, except for the hours that are shown on these flow diagrams?

Trial Examiner: I don't know whether I understand that question. The hours are not shown on the flow diagrams.

Mr. Branch: I think that your suggestion is entirely correct. The hours which are covered by Exhibit 61 and illustrated by the flow diagrams, Exhibit 62. *A* Other than the hours when 100 per cent Massachusetts energy is shown as being delivered to Winsted, Bristol and East Hampton, I have not calculated the percentages of Massachusetts energy delivered at those points.

Q Take the hours when you have considered that energy was delivered both from Massachusetts and from Connecticut sources, according to your theory, have you made any calculations to determine the percentages? *A* Do you mean by that, hour by hour, the amount of percentage at each point?

Q Hour by hour, or any other way. [*1822*] *A* I have considered the general question of energy from both sources going to each point, but I have not made calculations for each hour.

Q Is it not true that in the hours in which you concluded that Massachusetts and Connecticut energy were both supplied to

these points, that Massachusetts energy or Connecticut energy predominated in most instances? *A* (No answer).

Q Well, if it is going to take a good deal of time to do this, we can probably work it out. Maybe I can clear this up for the purposes of cross-examination.

Did you mean to convey in your testimony, your direct testimony, the impression that where there was mingling, under your theory, Massachusetts energy predominated or not? *A* I did not attempt to create any impression, I presented figures and the figures speak for themselves.

Q Have you endeavored to ascertain, or do you know if it is true that at all of these hours that are shown in Exhibit 61, your largest study, the Hartford steam plant was generating, and its generators were connected with the C. P. lines 1 and 2?

Mr. Wahrenbrock: May I have the first part of that question read, please?

Trial Examiner: I think perhaps the reporter better read the whole question.

[*1823*] (Question read by the reporter.)

Mr. Wahrenbrock: The question is slightly ambiguous in that it does not specify which of the Hartford's several generators it means when it says that Hartford's generators were connected, were generating and connected.

Mr. Branch: I think he can answer that question.

Mr. Wahrenbrock: I press the objection, Mr. Examiner.

Trial Examiner: Is there any question of more than one group of Hartford generators involved in the C. P. lines?

Mr. Wahrenbrock: Yes, I understand there are more than one, possibly four or five Hartford generators that are connected to the 11 k. v. bus which is connected by the lines that have been referred to as 122, 123 and 124, with the 66 k. v. bus of the Connecticut Power Company at South Meadow.

Trial Examiner: Does counsel refer to the Hartford generators at South Meadow?

Mr. Branch: Yes, sir.

Trial Examiner: Does that clarify the question?

Mr. Wahrenbrock: No, sir; that is where there are four or more, I think five generators located.

Trial Examiner: Does the witness understand the question?

The Witness: I will answer it as I understand it, and state what my understanding is.

Trial Examiner: All right, you may do that.

A I made no attempt to note on the Connecticut Valley [*1824*] Power Exchange sheets how much The Hartford Electric Light Company was generating or what plants of The Hartford Electric Light Company were generating, and I have previously testified that The Hartford Electric Light Company's 11 k. v. bus was connected through transformers to the 66 k. v. bus of The Connecticut Power Company, and that C. P. 1 and C. P. 2 lines were connected to the 66 k. v. bus. I believe I have covered the question.

* * * * * * * [*1847*]

Q I call your attention to a list which you have handed me headed "Days having hours when Falls Village generation was zero and simultaneously Massachusetts energy was received at [*1848*] South Meadow Station"; also a list headed "Days having hours when Falls Village generation was less than the deliveries to Central Hudson Gas and Electric Corporation, and simultaneously Massachusetts energy was received at South Meadow Station. Those two lists contain the 321 days that you refer to in your direct testimony and which were also referred to in cross examination? *A* Yes, sir.

Q They do not indicate, do they, the hours of the days in which the conditions indicated by their headings occurred? *A* They do not.

Q And you do not mean that during all of each of those days the conditions obtained, indicated on their respective headings, do you? *A* I mean that those days had hours when Falls Village generation was either zero or less than the delivery to Central

Hudson Gas and Electric Corporation simultaneously with the receipt at South Meadow of energy from Massachusetts.

Q They do not indicate, do they, how many hours on each day the condition indicated obtained? *A* They do not.

Q You are unable to say, I understand? *A* At this moment I couldn't say that.

Q Now, is it possible that even when the conditions indicated in these headings occurred, the Massachusetts energy [*1849*] which, according to your theory was received at South Meadow substation went in whole or in part to the 11 k. v. bus of the Hartford Electric Light Company? *A* Every effort was made in the collection of those days to omit any days when the energy went in whole to the 11 k. v. bus from South Meadow. It is possible that there may be one or two that were inadvertently included in that list that should not be, but I would say that practically every day stated there during the hours when energy was being received at South Meadow from Massachusetts and Falls Village.

Just a minute. I am sorry. Your statement about the percentage going to the 11 k. v. bus is impossible on its face because when Falls Village generation is zero or less than the deliveries to Central Hudson Gas and Electric Corporation, it is impossible that all the energy coming from Massachusetts to South Meadow should go into the 11 k. v. bus because the loads on the C. P. lines have to be served from some source, and when Falls Village is unable to serve it they must be served from South Meadow.

Q Well, you say it would be impossible then, according to your theory, that all of the energy during one of the hours in question went into Hartford? It is not impossible, is it, that during the hour energy also was delivered, according to your theory, from the Hartford generating plant to the C.P. lines? *A* Yes, I have indicated in the tables at the head that [*1850*] there are certain flow conditions when energy from Massachusetts alone passed into C.P. 1 and C.P. 2 lines at South Meadow, and there

were other conditions when the energy from Hartford and from Massachusetts passed into the C.P. 1 and C.P. 2 lines.

* * * * * * [*1852*]

Q Isn't it true, Mr. Miller, that in any of the hours which are in the days which are included within the descriptions of Exhibits 64 and 65, energy may have been delivered to the South Meadow substation, generated at The Hartford Electric Light plant, according to your theory? *A* Yes, that may be true, and the reverse may be true. Energy may not have been delivered from The Hartford Electric Light Company to the South Meadow substation.

Q And you just don't know about that, I take it?

The Witness: Can I have the previous question, so I can relate the two?

Trial Examiner: Read the question back to the witness.

(The record is read by the reporter.)

[*1853*] Mr. Branch: Let me rephrase the question.

Mr. Wahrenbrock: Mr. Examiner, before it is put, may I ask counsel to clarify the question, what he means by "here", whether he means on these two lists or some other place.

Trial Examiner: I think that possibly might be followed from the context.

By Mr. Branch: *Q* Mr. Miller, I am now referring to Exhibit 64 for Identification and 65 for Identification. I am referring to the hours in the days on those lists, in which the conditions obtained indicated by the heading on those days. Is it not possible that during each of those hours energy was also received at the South Meadow substation, which under your theory, was generated by The Hartford Electric Light Company? *A* No.

Q Why not? *A* You used the expression "during all of those hours." It is during some of those hours, energy may have been delivered from The Hartford Electric Light Company to the South Meadow substation. During other hours energy was definitely not delivered from the South Meadow—I mean from The Hartford Electric Light Company to the South Meadow substation.

Q Well, you have analyzed certain of the hours of these days, and have embodied your analysis in Exhibit 61 and the flow diagrams, which is Exhibit 62, is that correct? [*1854*] *A* I have prepared a table for 21 days, and flow diagrams, illustrating the flow conditions existing during the hours of those 21 days.

Q Except what is shown in those exhibits, I take it you do not know whether the condition I have mentioned obtained during the rest of the hours or not, is that correct? *A* The rest of the hours of what?

Q Of these days on these lists. *A* I do not know specifically, hour by hour, what the flow conditions were on those days, but I do know from my examination of the Connecticut Valley Power Exchange log sheets that I observed many days having hours when Massachusetts energy was received at South Meadow, and simultaneously energy was delivered to The Hartford Electric Light Company and also Falls Village generation was zero, or less than the energy delivered to the Hudson Gas and Electric Corporation. But I did not attempt to copy all the information that is contained in the log sheets. It would have been unnecessary for my purposes, and a rather stupendous undertaking.

* * * * * * [*1855*]

Q Assume there was just one plant in Massachusetts that was generating energy which was connected with the Hartford-Agawam line; assume this was an hour in which you have testified Bristol was supplied entirely by energy from Massachusetts; assume that that Massachusetts plant during that hour shut down; what would have happened?

* * * * * * [*1856*]

The Witness: You have not given me sufficient information. You told me concerning a plant in Massachusetts being connected to the Hartford-Agawam line as being the only plant in Massachusetts. You have not told me whether or not there were any plants in Connecticut which were connected with those lines, and I

can't answer the question without having the information more complete than that.

* * * * * *

Q Don't you know from your investigation, Mr. Miller, that at all times the South Meadow and Falls Village generating plants were connected to CP lines 1 and 2? [*1857*] *A* I do not know that.

Q Do you mean to say in your investigation you did not ascertain that fact? *A* You asked me if I knew that they were, and I say I do not know that they were. I know there are occasions when Falls Village was cut off from CP1 and CP2 lines.

Q And that was the occasion when The Hartford Electric Light Company was cut off, wasn't it? *A* I did not see any statement that it had been cut off.

Q Don't you know from your examination of this matter that that plant was always connected with the CP1 and CP2 lines? *A* I have not been concerned with the Hartford steam plant. I was concerned with determining whether or not Massachusetts energy was received at South Meadow and delivered to CP1 and CP2 lines for delivery to loads along those lines, and the question of whether or not the Hartford plant was or was not operating did not enter into that study directly.

Q Didn't the log sheets which you examined show the Hartford plant was generating every hour? *A* I did not examine the sheets to determine that.

* * * * * * [*1860*]

Q And you mean to say now you don't know whether it is a fact that these log sheets did show that every hour there was a generation at the South Meadow steam plant? *A* I do not know whether those log sheets show generation at the South Meadow plant of The Hartford Electric Light Company every hour.

Q Well I notice you say "every hour". You were aware of the fact, were you not, that that was, if not the universal situation, the almost universal situation? *A* I really can't say that I was

aware of it. I will be frank to say it will be my impression that there were units of the Hartford Electric Light Company, if not actually generating, available to deliver energy, but I would not [*1861*] have any reason to know whether the units were definitely generating. They could be floating on the line.

* * * * * * [*1864*]

Q I want to know if this is a correct statement. Your flow diagrams which are in evidence as Exhibit 62 show only the situations which existed in those hours which are listed in Exhibit 61. Is that correct? *A* That is correct.

Q And those flow diagrams are all based on the assumptions that there can be no simultaneous counterflow of energy, is that correct? *A* I wish you would clarify that question, Mr. Branch.

Q If it is possible that there is simultaneous counterflow of energy on the conductors between the 66 k.v. bus at the South Meadow plant and the 11 k.v. bus in the Hartford Electric Light Company plant at South Meadow, the basis for these flow diagrams would disappear, would it not?

The Witness: Could I have that question read to me?

Trial Examiner: Will you read the question back for the benefit of the witness?

(Question read by the reporter.)

A I must first state that—

Mr. Wahrenbrock: Mr. Examiner, I am going to object to that [*1865*] particular question as going beyond the scope of proper cross-examination. The witness has not been examined upon the theories if they are theories, or the principles put on to support those theories, which underline the statements that have been made. If respondent's counsel wants to inquire into that question, he is at liberty to examine Mr. Thomas, who has testified on that point.

Trial Examiner: I believe that the point is well taken. As I recall, it may be that in the cross-examining of a second witness, counsel may have become slightly confused as to what testimony

was given by each witness, but I do not recall that the present witness testified in direct examination on this. If he did, I would be glad to have my attention called to it.

Mr. Branch: Well, sir, I think possibly we can clear this thing up quickly. Let me ask another question.

By Mr. Branch: *Q* Is it true, Mr. Miller, then, that you do not know the basic principles upon which these flow diagrams are prepared?

Mr. Wahrenbrock: Mr. Examiner, there is no basis in the record for that.

Trial Examiner: I don't think that question arises particularly. If the witness didn't testify to them, they are not in line of examination.

Mr. Branch: I am somewhat astounded, if I understand the situation.

[*1866*] Trial Examiner: I am not sure of the purpose of your asking the question. If the purpose of asking the question is to explore the basis of the preparation, that may be another matter, Mr. Branch.

Mr. Branch: That is one purpose. I don't want to mislead you into thinking it is my only purpose. I think it is rather surprising that the witness prepares some exhibits, and they are introduced in evidence in his testimony, that I can't inquire as to the principles which underlie the preparation, or ask whether he knows them.

Trial Examiner: You may ask that. That is certainly clear.

Mr. Wahrenbrock: Mr. Examiner, I have long postponed a request that I wish to make, and I started to make at the beginning of this line of inquiry and which I postponed in order that I may not interrupt this line of inquiry, but I wanted to ask, because I didn't hear clearly the preceding question and answer which related to flow diagrams and Exhibit 61.

Trial Examiner: The question and answer will be read for Commissioner's counsel. Does that bear upon any question of any possible objection? Unless it does, I would like to have the wit-

ness complete the answer, and then have the previous question and answer read, if it is not material to any objection you propose to make.

[*1867*] Mr. Wahrenbrock: Well, if it is as I recall it is, I will have an objection to make.

Trial Examiner: All right. The Reporter will read the question and answer requested by Commission counsel.

(Question and answer read by the reporter.)

Mr. Wahrenbrock: Mr. Examiner, the question was not as I had recalled it.

Trial Examiner: Does the witness have the present question before him?

The Witness: I do not.

Trial Examiner: The last question will be read for the benefit of the witness.

(Question read by the reporter.)

By Mr. Branch: *Q* Do you of your own knowledge or your own experience know whether there can be simultaneous counterflow of energy in the same conductor?

Mr. Wahrenbrock: Mr. Examiner, I am perfectly willing to have that question put to the witness, but I think it should be labeled "Direct-examination" and it should so appear in the record because it is outside the scope of cross-examination.

Trial Examiner: I don't think that that is necessarily so. We will permit the witness to answer the question. It may be close to the line, but it goes to the matter of the basis of his preparation of the exhibits.

[*1868*] The Witness: I will have to have the question read.

Trial Examiner: All right, you will read the question back to the witness.

(Question read by the reporter.)

A When conductors are of the type and size and the dimensions used in South Meadow substation and other substations, there cannot be simultaneous counterflow.

Mr. Branch: That does not quite answer my question, Mr. Miller.

By Mr. Branch: *Q* I asked you whether you knew from your own knowledge or your own experience that that was so. What knowledge or experience have you had, if any, which enables you to make that positive statement? *A* I previously stated I was educated as an electrical engineer.

Q What experiments or study have you ever made that enables you to reach the conclusion which you have stated as to counter-flow? *A* In the study of electrical engineering in order to have energy flow in a circuit, it is necessary that there be a current flow in the circuit. In order that there be a current flow, there must be a voltage to cause that current to flow. A voltage can cause that current to flow in only one direction in a conductor at a time.

Mr. Branch: Will you read my question, please Mr. [*1869*] Reporter?

(Question read by the reporter).

By Mr. Branch: *Q* Will you now answer that question? *A* I did answer that question.

Trial Examiner: I don't think the answer is responsive to that question. It is simply a repetition of a statement.

The Witness: I fail to understand you. I was asked what study I have made and I stated my study of electrical engineering had given me a series of facts that enabled me to state that.

Trial Examiner: I still don't think that you fully understand the question. Perhaps respondent's counsel may clarify his purpose by further questions, if he feels that the answer is not responsive.

Mr. Branch: I didn't hear your remarks, sir. If you told him to answer the question I don't care about hearing them.

Trial Examiner: He feels that he has answered the question.

By Mr. Branch: *Q* Is that the only answer you can give, Mr. Miller?

Mr. Wahrenbrock: Mr. Examiner, I must object to this line of

inquiry on the ground that I have already stated, that it goes beyond the scope of proper cross-examination of this witness. I am willing that it be pursued, but as direct examination, which it is.

Trial Examiner: It is an examination of the basis of the [*1870*] exhibits prepared by the witness. You should not complain if respondent's counsel desires to qualify a witness as an expert for you. You may proceed, Mr. Branch.

Mr. Branch: I thought he qualified him as an expert, or tried to, and it seems to me that this goes directly to that.

Trial Examiner: I think counsel may be mistaken on that. I did not so understand it.

By Mr. Branch: *Q* Mr. Miller, until you came to the Federal Power Commission, did you ever attempt to ascertain from what particular source a load was supplied, where there were several generating plants connected with the conductors which led to the load? *A* No.

* * * * * * [*1871*]

Q Is it not true that the engineering profession never found it necessary to study the question of what particular source supplied a particular load where there were two generating plants connected with the conductor which went to that load, until the Federal Power Commission started the kind of studies that are presented here? *A* Your question does not permit of a direct "yes" or "no" answer, Mr. Branch.

Q As far as you know, is that not true? *A* Even with that qualification I have got to explain, and I can answer your question substantially in the affirmative, but I think the importance of knowing which particular generators supplied which particular load became a matter of importance immediately subsequent to the passage of the Federal Power Act, not necessarily only since the time the Federal Power Commission started these studies, but prior to the passage of the Federal Power Act the engineers did not have to concern themselves with which generator supplied which load. Yet, in actual operation, the designs and the sizes

chosen for their transmission line conductors indicated that they did ascribe certain loads to certain sources.

Q You have spoken about the passage of the Federal Power Act. I assume you mean the passage of those parts of the act which became effective in August, 1935, do you not? [*1872*] *A* I do.

* * * * * * [*1873*]

Q Have you ever conducted any experiments yourself to ascertain the answer to this problem? *A* May I have the whole question?

Trial Examiner: This is the question that he is now asking you. He has changed the question now.

Will you read this last question to the witness?

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: The question is not clear to me.

Trial Examiner: I think perhaps if you will repeat what you meant by the problem—I think you have already stated it to Commission's counsel, but it doesn't appear in the question.

By Mr. Branch: *Q* Of tracing a source of energy supplied to a load, where the load was connected with two or more generating plants. *A* No.

* * * * * * [*1877*]

Q Leave out of consideration for the minute the particular times when you conclude that Hartford was not delivering energy to the South Meadow plant. Except for those hours, are you able to say that there was any hour in the 321 days when the delivery of electric energy by Hartford to South Meadow was less than the combined loads of Bristol, Winsted, and East Hampton? *A* I have before me Saturday, November 26, 1938, and I note here that on the hour ending 8:00 P.M. of that day—wait a minute—the hour ending 5:00 P.M. of that day, 4,000 kilowatt hours were received at South Meadow from The Hartford Electric Light Company, and the Bristol load alone was 6,000.

Take the hour ending 9:00 A.M. of that day, and there [*1878*]

was received 4,000 kilowatt hours from The Hartford Electric Light Company, and the Bristol load was 9,000 kilowatt hours. So that it is apparent even when Hartford is delivering energy to South Meadow substation, the amount of its delivery is less in many cases than the loads at these various points.

Q You say in many cases. I don't suppose you can tell how many cases that is so? *A* No, I couldn't do that.

Q The illustration you gave us for one of these 21 days, was it not, Mr. Miller? *A* Yes, sir.

Q As I understand it, outside of what is shown in this exhibit, you are unable to give me any answer to the question I asked? *A* You made your question awful broad. I have stated that while I have not the figures for other days, I did note in examining the log sheets that there were many occasions when Hartford was receiving energy from South Meadow, and there were other occasions when Hartford was delivering small amounts of energy to South Meadow. So that my knowledge goes beyond the 21 days shown in this table.

* * * * * * [*1879*]

Q Yes, Mr. Miller, I will be just as specific as you want. You seem to be able to understand, I think. Let us take one of the situations where you have said electric energy was delivered to the C.P. Lines at South Meadow from Massachusetts and at the same time energy was delivered to those lines from the generating plant of The Hartford Electric Light Company. Is that specific enough to enable you to understand what I mean? *A* Then you mean the energy passes along the C.P. lines to the various loads?

Q Well, I want to know what happens after they meet. [*1880*]

A I see.

Mr. Wahrenbrock: Mr. Examiner, there are certain assumptions as to physical principles involved in the very wording of the question "when they meet". I don't know what "they" is that meet.

Trial Examiner: I think it is clear, Mr. Wahrenbrock, what "they" is.

Mr. Branch: I will put "on a common conductor". There seems to be a great unwillingness to understand.

Trial Examiner: There seems to be some question as to whether there was any particular connotation in the word "meet". That seems to be more questionable.

By Mr. Branch: *Q* All right, when they are both put on the same time conductor at the same time. *A* Energy cannot be identified, that is, energy from two sources cannot be identified in any manner by our senses. We have no physical sense that enables us to identify and classify energy and say "This energy comes from Massachusetts" and "This energy comes from Connecticut". We know from the facts concerning generation of energy at a generator, and the facts concerning consumption at a load and laws relating to the flow of currents along conductors, that there is a flow of energy. The question arises, when energy from two sources is put on, as you say, a common conductor, to supply loads along [*1881*] the line of which that conductor is part of the circuit, exactly what relationship there is between energy from one source and energy from another source.

The energy from each source will be delivered to the loads along that conductor in the proportions that the total energy delivered to the conductor or to the circuit, according to the relationships of each source to the total energy delivered to that conductor, so that, as I said in my statement in direct, I believe that the energy delivered to various points along the C.P.1 and C.P.2 lines will have been energy from both sources approximately in the ratio that the energy from both sources was delivered to the South Meadow substation.

Q Well, you have stated a conclusion. Will you tell me upon what observation or knowledge that conclusion is based?

Mr. Wahrenbrock: Mr. Examiner, the same objection, of course, as to this. I put on a separate witness to prove the principles.

Trial Examiner: The objection will be overruled. It is part of the examination, the background of the testimony of the witness.

A Since, as I have stated, there is no way of tagging individual

units of energy, and yet we find that energy does flow, it becomes necessary to examine the types of flow that occur among things that we can see.

[*1882*] We can observe the flow of water. We can, necessarily using different dyes, watch the flow of water. We can by means of smoke, watch the flow of gases, and by using two materials of different kinds, observe how they would flow.

We are dealing in a circuit such as these with conductors which are relatively long with respect to their cross-sectional dimensions, and in that case the flow is similar to the flow of fluids in a pipe, and whether or not there is any definite connection between the generating source and a load with regard to a particular bit of energy, or whether or not there is a complete intermingling of energy along that conductor, our experience would indicate that the same proportions would hold as hold in the case of material things that we can actually see.

Q Well, you say your experience would indicate that. How have you been able to determine that is so? *A* I have never conducted special experiments, but certainly I have seen liquids from several sources mixed together.

Q I am not talking about liquids which you can color. You can't color electric energy, can you? *A* No, but I have stated that we do know that the flow of energy is similar to the flow of other things, and therefore we can certainly apply our experience in other matters to a thing that we can't see.

[*1883*] *Q* How do you know that the flow of energy is similar to the flow of water? *A* Well, I can best give it to you by an analogy. We know that energy is delivered at a source, it passes along a conductor and is delivered to a load. We know that we put water into a pipe at the reservoir, and pass it along to the tap in a house. It is exactly the same idea of flow involved there.

Q And that is the only basis you have for your conclusion, is it? *A* Why do you put it "the only basis"? I don't know what the connotation there is.

Q Have you any other basis for your conclusion than the analogy of water that is colored? *A* You could do the same thing if you mixed cement and sand. We see every day cement and sand mixed together to make concrete, cement, sand and stone, and they are three different materials, and they are put into pipes and into these various mixing containers and mixed together. There are any number of times in our experience we see things being mixed together.

Q Those are all tangible things that you can see, aren't they? *A* I have stated you can't see energy.

Q Have you any other basis for your statement other than [*1884*] what is based upon tangible materials such as you have mentioned? *A* That is all the basis I have.

Q Will you turn to your sheets for May 26th, 1941, on Exhibit 61.

Mr. Wahrenbrock: What was the date, please?

Trial Examiner: May 26th, 1941, Mr. Wahrenbrock.

By Mr. Branch: *Q* I take this by way of illustration and there may be other days, of course, upon which the figures differ.

Let us take the first hour there, 8:00 A.M. Your table indicates that you have concluded that there was received from Massachusetts 3,000 kilowatt-hours, and from The Hartford Electric Light Company 24,000 kilowatt-hours. Those receipts being by the substation at South Meadow. That is correct, is it not? *A* That is right.

Q Now, what would you say that Bristol received during that hour? *A* Bristol received 14,000 kilowatt-hours.

Q What would you say would be the source of supply of that 14,000 kilowatt-hours? *A* Part from Massachusetts and part from the system of The Hartford Electric Light Company.

[*1885*] *Q* You do not know, do you, at what times during the hour that 3,000 kilowatt receipt came in? *A* No, I don't.

Q Is it not possible that it all came in during a certain fifteen minutes of that hour? *A* It is possible, but not probable.

Q It is possible, though? *A* Yes, but not probable.

Q And is it not possible that the Bristol load of 14,000 kilowatt hours all occur during, say, the last forty-five minutes of that hour? *A* No.

Q Why not? *A* It would require that every electrical device that connected to the load of The Connecticut Light and Power Company in Bristol would be disconnected and not taking energy during the first quarter of an hour.

Q The point is this: You cannot say, can you, what part of the Bristol 14,000 kilowatt hours came from Massachusetts, and what part came from Hartford, even according to your theory? *A* I can in this way, that, if you will note the other hours given immediately after that hour ending 8:00 A.M., that there was a fairly steady flow of energy from Massachusetts to South Meadow over the period of hours, and any theory as to [*1886*] its occurring during a fifteen-minute period would require very rapid fluctuations that do not appear reasonable.

Q But in order to make any accurate analysis as to what any particular load received, you would have to know what the load was at the particular instant, wouldn't you? *A* If I was determining what the source of energy to a particular load at a particular instant is, I would have to know the amount of load and the amount of energy being delivered from each source.

Q Doing this on an hourly basis means merely some kind of an approximation, doesn't it? *A* I wouldn't consider it an approximation, no.

Q What would you say as to those 14,000 kilowatt hours which were delivered at Bristol? Would you say that 24/27's of it came from Hartford, and that 3/27's came from Massachusetts? *A* Possibly that, yes.

Q You have not considered the Middletown load, have you? *A* I don't see why the Middletown load enters into your question particularly.

Q Well, between South Meadow and Bristol, there is a Middletown division which presumably has a load? *A* Yes.

Q And that load would be supplied, would it not, from this source or these sources? [*1887*] *A* Yes.

Q And how can you say that all of this 3,000 kilowatt hours from Massachusetts was not delivered to the Middletown load? *A* Because the data indicates that—no, it goes right back to my previous answer. In order that that entire 3,000 kilowatt hours should be delivered to Middletown only, it would require, as I have stated, that during the period of delivery of 3,000 kilowatt hours, that the Bristol district should have been disconnected from all sources of electric energy, and I don't believe anyone would accept that as reasonable.

Q I am not asking you to accept that. I am asking you what basis you have for attributing any of that 3,000 kilowatt hours which you say came from Massachusetts to Bristol, in view of the fact, which I understand to be a fact, that the Middletown load would have been more than 2,000 kilowatt hours. *A* During the hour?

Q Yes. *A* Even if it were, energy from both Massachusetts and from Hartford was received at South Meadow substation during that hour, and passed out on to the CP1 and CP2 lines, and all loads supplied from the South Meadow end of the CP1 and CP2 lines would have energy from both those sources delivered during that hour.

Q That is all based on your theory or your assumption that the proportions remain the same throughout, is it not? [*1888*] *A* It is based on my explanation that I have given to you before.

Q It is true, is it not, that you do not know what happens to the energy from Massachusetts and from Hartford under conditions which you postulated, whether they mingle or run along side by side. *A* I have stated there is no reason of identifying energy units from different sources, so I certainly cannot postulate for you that they either run along side by side or mingle. But the fact does remain that whichever they do, each load will get energy from each source in proportion that each source is delivering energy.

Q Well, isn't it true that when you put energy from two sources on a common conductor at the same time, the identity of the energy from each source is entirely lost? *A* Yes, the identity of each individual unit is lost, but it still does not prevent us from knowing that energy from each source is being delivered to each load.

Q Now, you have based your conclusion and reasoning on analogy to water, among others. Do you consider such reasoning by analogy is a valid scientific basis for establishing a conclusion where the use of the analogy requires nothing beyond the actual experiment or experience?

Mr. Wahrenbrock: May I have that question read, Mr. Examiner?

[*1889*] Trial Examiner: The question will be read for the benefit of counsel for the Commission.

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Branch: I am sorry, if I said the words you read, I didn't say what I intended to say. May I reframe the question?

Trial Examiner: You may reframe the question.

By Mr. Branch: *Q* Do you consider reasoning by analogy a valid scientific basis for establishing a conclusion where the use of the analogy requires going beyond the actual experiment or experience? *A* The question is very very vague. Words are used that are very difficult to—

Trial Examiner: Do you now understand the question?

The Witness: I could think of a half dozen questions it might mean. I don't know which one it does mean.

Mr. Branch: Nobody here of our scientific men seems to have any difficulty understanding it, but if Mr. Miller doesn't understand, we will try to rephrase it.

By Mr. Branch: *Q* Is it not a scientific principle that analogies hold or are good only when the similarity between the two matters is established? *A* Yes, analogies are only good when there is similarity.

[*1890*] *Q* Now, as I understand it, you have said that the analogy between the flow of electric energy and other more tangible physical flows is the only basis you have for the justification of your theory of allocating energy from particular sources to particular loads; that is correct, is it not? *A* I have stated that. I believe I have limited my analogy to the flow in conductors which are relatively long with respect to their cross sectional area, and therefore closely approximate the flow of things in long pipes.

Q How do you know it does? *A* Purely from the fact that a conductor in general has—such as the conductors, say, at South Meadow—their dimensions are long in respect to their cross sectional area. Then take the circuits from South Meadow substation to The Hartford Electric Light Company. They certainly —they are conductors of the ordinary shape and size, and energy has to flow along those conductors, and physically they resemble long pipes in which materials are flown.

Q Pipes are hollow, aren't they? *A* Well, the question of hollowness doesn't enter into electrical circuits, apparently, for solid conductors can act as a hollow pipe for energy.

Q Do you understand that energy flows only inside of the conductor? *A* There seems to be no generally accepted theory as to [*1891*] how the energy flows. There have been various theories advanced, but the practical working concept is that the energy flows in the conductor.

* * * * * * [*1896*]

Mr. Wahrenbrock: Mr. Examiner, if respondent's counsel will permit the use of the copy which I furnished them for that purpose, I should like at this time to offer in evidence Exhibits 64 and 65 for Identification.

Mr. Branch: Well, they have been referred to. It seems to me they don't add much to the picture, because it does appear that the witness is indefinite as to the hours of those days or how many hours there are.

Trial Examiner: However, they do furnish some information from which any one might make an investigation of other exhibits, if there are any, as to what happened on those particular days.

Mr. Branch: I am going to take the position of objecting until something more appears. They are marked for identification, and it would seem to me—

Trial Examiner: I don't recall at the present time whether any of the log sheets are in evidence or not.

Mr. Wahrenbrock: None of the log sheets are in evidence.

Trial Examiner: It seems to me that in any event these may be admissible, if counsel desires to offer any further exhibits. There is no objection as to the fact that this exhibit was originally introduced and marked for identification on behalf of respondent's counsel, is there?

Mr. Branch: Oh, no.

[*1897*] Trial Examiner: In that event, the Trial Examiner will rule that Exhibits 64 and 65 are admitted in evidence.

Mr. Branch: And my exception is automatic.

Trial Examiner: Your exception will be noted.

* * * * * *

(Exhibits 64 and 65 for Identification received in evidence as Exhibits 64 and 65.)

Mr. Wahrenbrock: I note that Exhibits 61 and 62 for Identification have not been offered. I therefore offer them at this time.

Trial Examiner: Is there any objection to the offer?

Mr. Branch: My objection to the offer is that there is not a proper basis for offering them. I wish to state that [*1898*] that is not based upon the absence of the log sheets, or fundamental data at that time, because I feel that I have an understanding with Mr. Wahrenbrock in regard to what I may wish to do, which of course will apply to him, that those things need not be produced. I object, and I want to make it clear that that is not the basis of

my objection, but I do object on the ground that otherwise proper foundation has not been laid.

Trial Examiner: It seems to me that the manner of their preparation has been established, and any questions raised in rebuttal would be explanatory.

The Trial Examiner rules that Exhibits 61 and 62 may be admitted in evidence.

Do you desire an exception noted?

Mr. Branch: Yes, sir.

Trial Examiner: Exception will be noted for the respondent.

Mr. Branch: I understood that was done automatically.

Trial Examiner: Not automatically in the case of exhibits. I would suggest in the case of admission of exhibits that a separate exception be asked for.

(Exhibits 61 and 62 for Identification received in evidence as Exhibits 61 and 62.)

Redirect Examination by Mr. WAHRENBROCK.

Q Mr. Miller, did you, in selecting the 321 days to [*1899*] which you have referred in your earlier testimony, and which you have listed in Exhibits 64 and 65, make any effort to include in those 321 days, all days on which flows of the kinds illustrated by Diagrams G and H occurred? *A* No.

Q Were there other days not included in those 321 days during which such flows illustrated by diagrams G and H of Exhibit 62 occurred? *A* Yes. My notes indicate that there were probably 280 days when flow conditions illustrated by flow diagrams G and H occurred.

Q Do I understand that those 280 days are other days than those listed on Exhibits 64 and 65? *A* Yes.

Q In addition to the 321 days listed on Exhibits 64 and 65, and the approximately 280 days to which you have just referred, were there yet other days on which there occurred flows of Massachusetts energy to one or more points of delivery from The Connecti-

cut Power Company to The Connecticut Light and Power Company from the C.P. 1 and C.P. 2 lines, not included in the approximately 600 days?

Mr. Branch: I will object to that. That calls for a conclusion which must be based on a number of different calculations and assumptions, and it doesn't appear that work has been done, or at least the work isn't here, or the basis [*1900*] for that conclusion isn't here. I object.

If counsel for the Commission can prove his case that way, all he needs to do is to have the witness come in and say he has found many days or at least a certain number of days, on which Massachusetts energy flowed into Connecticut, and then got to our plants. Obviously we can't be bound by that kind of testimony.

Trial Examiner: I think the question goes beyond the proper scope of redirect here.

Mr. Wahrenbrock: Mr. Examiner, may I be heard on that?

Trial Examiner: You may.

Mr. Wahrenbrock: On cross examination, respondent's counsel has asked a lot of questions which, as framed by respondent's counsel, seem to assume that certain of the flow conditions to which the witness testified on direct examination were limited to 321 days or to some smaller number of days. I wish to clarify any ambiguity of the record in that regard in order to bring out what was testified to by the witness on direct examination, that these 321 days were not the only days.

Mr. Branch: I think I confined my cross-examination to the 321 days.

Mr. Wahrenbrock: Mr. Examiner, I definitely recall the number of 1,600.

Trial Examiner: The number 1,600 days was used and referred to the matter of the 321.

[*1901*] Mr. Wahrenbrock: And there was an effort to bring out a ratio between them which was, I am about to prove, entirely erroneous in its implication.

Mr. Branch: Well, the 1,600 days, sir, were merely the period

which was covered by the figuring of the 21 days. I didn't inquire about those other days, as I recall it.

Trial Examiner: The implication of the question, as I recall it, was that there was a question as to whether it was 321 and what portion of the 1,600 that was. I think that may well be within the scope of redirect, but I would suggest that counsel does build some of the background on which the statement is to be made.

Mr. Wahrenbrock: In that connection I would refer to the witness's description of his study, the data studied, of his method of examining the data, in order to ascertain certain particular facts. I will now ask the preliminary question:

By Mr. Wahrenbrock: *Q* In the course of your study of the data, while you were selecting the 321 days which are listed in Exhibit 64 and 65, did you observe that on other days flow conditions occurred whereunder Massachusetts energy would be delivered to one or more points of delivery by The Connecticut Power Company to The Connecticut Power and Light Company on the C.P. 1 and C.P. 2 lines?

[*1902*] Mr. Branch: I object to that.

Trial Examiner: I think, Mr. Branch, it is understood that it would be upon the basis of the theory which he has already explained.

The Witness: Yes, I have stated—

Mr. Wahrenbrock: If I may ask a further question.

By Mr. Wahrenbrock: *Q* Does that complete your response to that question? *A* No, I am trying to explain.

Q Will you do so, please? *A* I have stated that I examined the Connecticut Valley Power Exchange sheets to determine what information I needed in order to establish the flow of Massachusetts energy to C.P. 1 and C.P. 2 lines, and therefore, to loads along those lines. I stated that the 321 days were based on the facts that they had hours when generation at Falls Village was zero or less than the deliveries to Central Hudson Gas and Electric Corporation, simultaneously with the receipt at South Meadow of energy from Massachusetts.

I also stated that I made note of the days when the generation at Falls Village was small, or the generation only exceeded the delivery to Central Hudson Gas and Electric Corporation by a small amount, of the order of about 1,000 kilowatts.

I also stated that I observed the deliveries to Bristol, and there were many hours when I noted that the generation at [*1903*] Falls Village was less than the delivery to Bristol when the Massachusetts energy was received at South Meadow.

I also noted hours when the delivery, when the difference between the generation at Falls Village and the deliveries to Central Hudson Gas and Electric Corporation were less than the deliveries to Bristol, making it apparent that Bristol could not have been supplied entirely from Falls Village generation, and therefore Massachusetts energy received at South Meadow must have been delivered in part to Bristol. I further noticed on those log sheets—

Q May I interrupt to ask if those instances to which you have just asked referred to the 280 instances you previously referred to?

Mr. Branch: I object to that question. I am going to ask to have the answer to the last question stricken out and also as appearing to be based on information which the witness is not presenting.

* * * * * * [*1904*]

Mr. Wahrenbrock: Do I understand that respondent's counsel wants the witness to bring in the work sheets? I don't understand the question.

Trial Examiner: As I understand, there was a motion to strike.

Mr. Branch: Yes, sir. It seems to me it is one thing when the witness comes in here with some figures, and I want to make it clear here again that I am not objecting because the log sheets and so forth are not produced, but to have a general kind of a statement like this as to what was found, without any more indication than the witness has given, it seems to me to be entirely improper.

Mr. Wahrenbrock: Mr. Examiner, we have established the pattern by Exhibits 61 and 62. We have referred in the testimony that has been introduced to particular types of flow. Then the witness says that on 280 days he found one of those types of flow. And now I am asking him to state further whether he found further types of flow on other days. Now, the statement couldn't be any more definite and yet cover that much ground.

Mr. Branch: That is what I object to, his covering the ground in that way.

Mr. Wahrenbrock: I understood you to object to stating the number of days the flow occurred. I would object too if I thought that I had any grounds for objecting.

[*1905*] Trial Examiner: Mr. Wahrenbrock, that statement is out of order. Counsel will address the presiding officer in all cases.

However, it does not appear that this is improper matter for redirect examination. The objection is overruled and the motion to strike is refused.

* * * * * * [*1906*]

Q Permit me to interrupt. The question is whether the 280 days you previously referred to were the same or were different days from those—

Trial Examiner: What were the days you have just referred to here?

The Witness: My reference to the days when the Falls Village generation was less than the deliveries to Bristol or to Falls Village, generation minus the deliveries to Central Hudson Gas and Electric Corporation were less than the [*1907*] deliveries to Bristol, referred to the 280 days, and I was completing my statement by further stating that I had noticed that even during hours when the generation at Falls Village was of the order of, you might say, full capacity, that on certain days energy was received at South Meadow substation, and simultaneously the log sheets indicated delivery from South Meadow to the CP1 and CP2 lines.

which energy proceeded to loads along those lines, the exact points of which I would not be able to determine, although the first load, being Middletown, it is evident that Middletown at least would have received energy during those hours. I did not make any attempt in this last case to make any notations as to the particular days.

Mr. Branch: I ask that the answer be stricken on the ground I have indicated, by the witness's own admission.

Mr. Wahrenbrock: Well, Mr. Examiner, that corresponds with nothing in the statement that has been made. There is certainly in that statement nothing which can be characterized as an admission on which such an objection could be made. It is obvious—

Mr. Branch: May I hear that statement of counsel.

Trial Examiner: The reporter will read the remarks of counsel for the Commission.

Mr. Branch: The admission was that he had not noted the days, the very matter of which I complain.

[*1908*] Trial Examiner: I think that the answer can stand. That would go only to the weight. The question and answer will remain, and the motion to strike is overruled.

Note an exception for the respondent.

Mr. Wahrenbrock: Mr. Examiner, as the remainder of my statement is not on the record, and there might be some inference from the record as recorded, I would like to clear it. The rest of my statement was, it was obvious on the face of it.

Trial Examiner: All right, with that explanation. I don't think that was the part that was being objected to.

By Mr. Wahrenbrock: *Q* Mr. Miller, did the several types of flow conditions illustrated in Exhibit 62, occur only on the 21 days shown in Exhibit No. 61? *A* No. They occurred on the days included in the 321—one or more of those conditions of flow occurred on the 321 days that I have previously given lists of.

Q Are all of the types of flow conditions which occurred during the hours shown in Exhibit 61 illustrated by the flow diagrams in Exhibit 62? *A* Yes. The flow conditions existing during the hours shown in Exhibit 61 are illustrated by flow diagrams shown in Exhibit 62.

* * * * * * * [*1909*]

Q Are any flow conditions illustrated in Exhibit 62 which did not occur on some one or other of the days shown in Exhibit 61? *A* No.

Q In your cross-examination, how did you understand the question asked you in the following language, and I now quote from the transcript, page 1864:

> "*Q* I want to know if this is a correct statement: Your flow diagrams which are in evidence as Exhibit 62 show only the situations which existed in those hours which are listed in 61; is that correct?"

A I interpreted that question to mean that the flow diagrams showed, one or more of them showed all—illustrated all the flow conditions existing during the hours for the 21 days in Exhibit 61. But I did not interpret it, as it appears to me now, to mean that the flow conditions illustrated by flow diagram, Exhibit 62, did not occur on other days.

* * * * * * [*1910*]

PERCY H. THOMAS,

previously sworn, resumed his testimony:

Cross Examination by Mr. BRANCH.

Q Mr. Thomas, in relating your biography, I don't think you mentioned the period of your service with the Federal Power Commission. Will you bring your biographical sketch up to date in that respect? *A* I joined the staff of the National Power Survey, I think it was February 12, 1934, as chief of the Division of Power Requirements, I think. And I held that position until the completion of the work of the National Power Survey.

at which time I was appointed Regional Director of the Second Administrative Region of the Commission, with headquarters at Atlanta, and I still hold that position.

Q And you have then since about 1935 been Regional Director of the division with headquarters at Atlanta? *A* That was 1937. The National Power Survey continued for two years, or a year and a half, perhaps, after which I went with the Commission.

Q Are your duties as such Regional Director normally [*1911*] confined to the region in which Atlanta is located? *A* Well, if you mean by normally usually, I will say yes; but occasionally the Commission assigns me duties which take me outside of that area.

[*1912*] Mr. Branch: I want to ask you a few questions in regard to your testimony.

By Mr. Branch: *Q* In alternating current circuits, with loads such as we are considering in this case, does reactive or out-of-phase current ever flow? *A* Well, that is a very general question. As I understand it, it does.

Q Is the flow of such current an unusual or a usual occurrence? *A* I would say it was a usual occurrence, speaking generally.

Q And is there also a flow of in-phase current? *A* There often is.

Q Do these two flows, the in-phase, and the out-of-phase, occur in the same circuits at the same time? *A* A resultant current flows in the circuit which represents the two types.

Q Doess the out-of-phase current always flow in the same direction as the in-phase current at the same time? *A* Your question is very general, without giving a basis for the relation to the phases, but it is true that—

Mr. Wahrenbrock: Mr. Examiner—

Mr. Branch: I suggest that the witness be allowed to answer the question.

[*1913*] Trial Examiner: I think the witness may be allowed to complete his answer.

Mr. Wahrenbrock: Well, I object to the question.

Trial Examiner: On what grounds?

Mr. Wahrenbrock: It hasn't stated sufficient facts to enable an answer.

Mr. Branch: Mr. Examiner, I have been pretty patient, I think, but it seems to me that where the Commission's own witness goes ahead and starts answering the question, it is highly improper for Commission's counsel to interrupt him and object that there isn't sufficient basis, when the witness evidently found sufficient basis.

Trial Examiner: I think that the fact that the witness proceeded to answer indicates that there is sufficient basis. The witness may proceed. The objection is overruled.

A It is of course not true that at any instant of time current flows both ways in any particular circuit, but in considering what we call effective values, it is true that there come times in circuits when as a result of the voltage and current flow we get a balance which would be produced if we will say reactive energy flowed in one direction and true energy flowed in the other direction. I can't make you a very "Yes" or "No" answer, because the terms of your question are exceedingly broad.

By Mr. Branch: *Q* Is it not true, therefore, that the in-phase current [*1914*] and the out-of-phase current flows simultaneously in the same conductor? *A* I have said that there is a resultant current which in a sense represents the two. There are no two currents separately flowing in the conductor at the same instant of time.

Q Is the in-phase—is the power flow in a circuit given by the product of the voltage and in-phase current, using effective values, as you pointed out yesterday? *A* Well, am I to assume that you mean a circuit in which the power is flowing at a unity power factor, when you say "in-phase current"? I assume that is what you mean.

Q In phase with the voltage in that circuit. *A* Well, in that case the energy is the product of the voltage and the current effective values.

Q And is that power often called active power to distinguish it from reactive power? *A* I think that term is often used for that purpose.

Q Is the reactive power flow given by the product of the voltage and the out-of-phase current, using effective values? *A* If you have a circuit in which there is an out-of-phase flow of current, I mean one in which the power factor is zero, the reactive k.v.a. as it is commonly called, is the product of the voltage and the current.

[*1915*] *Q* Is reactive power flow given by the product of the voltage and the reactive or out-of-phase current, using effective values, when there is also in-phase current? *A* Well, for purposes of analysis, as a convenience, engineers sometimes think of a current in terms of two currents which might make up that current, and when it is worth while they may consider those currents separately as a convenience in calculations. I wouldn't answer the question the same way with regard to the physical conditions existing in the circuit itself.

Q These flows of active power and reactive power occur simultaneously on the same conductors? *A* If you set up a condition which would produce reactive flow in a certain conductor, and at the same time set up another flow that would cause an in-phase flow, and apply the two simultaneously, you will get a net result which for some purposes is the same, I mean you get a numerical result, you get a conclusion of the same effect showing what would have been accomplished if they could have flowed separately at the same time. It is convenient sometimes to look at them as though they did. As a matter of fact, of course, they don't flow simultaneously and in opposite directions in the same circuit.

Q I am going to use the term "direction" in the accepted sense employed by engineers concerned in electric power systems.

[*1916*] Are the flows of active and reactive power which occur simultaneously in the same or in opposite directions?

Mr. Wahrenbrock: Mr. Examiner, I object, unless there is a showing of the basis for the usage.

Trial Examiner: I believe the witness has stated that they did not occur simultaneously, and I think that the question says "which occur simultaneously".

Mr. Branch: Well, I mean simultaneously, in the sense that the witness has expressed it.

Trial Examiner: All right. The witness may answer the question.

A As a matter of convenience it is sometimes quicker to assume that the two are flowing simultaneously, in which case you can take it either way you like, according to what the conditions are; one being flow one way and one the other. That is not the physical fact, however.

By Mr. Branch: If it isn't the physical fact why then is it proper to think of the two components as existing separately?

A Well, it isn't always proper, but I say it often is a convenient matter. It depends on the knowledge and the skill of the man who is doing the work.

Q In the same sense that you have used the word "simultaneous" is there any essential difference physically or scientifically between the simultaneous flows of active power and reactive power on a given line or circuit on the one hand, [*1917*] and the simultaneous flow of two or more components of active power on the other hand.

* * * * * *

A That question doesn't mean anything to me. Could you rephrase it a little differently?

By Mr. Branch: *Q* Is not one justified in thinking of the two or more components of the active power as flowing simultaneously; of two or more components of active power flowing simultaneously? *A* Just what do you have in mind by two or more components of active power? I understand separating the components active and reactive, but just what do you mean by two components of active power?

Q Well, what I had in mind, by way of illustration, anyway, is power on a line that is supplied simultaneously from two different sources. *A* And then what is the question about that line?

* * * * * * [*1918*]

A In that situation, while there is no physical flow simultaneously in opposite directions, it might, for some purposes, be convenient to balance one side against the other. I don't know just what purpose you might have in mind.

* * * * * *

Q Assuming first they are being served in the same direction. *A* Well, there will of course, in that case, be a flow [*1919*] of resultant current. That doesn't seem to be the same matter you were inquiring about before, but my answer covers the fact.

Q All right. Now I will ask you the same questions. Assuming that the two flows are in opposite directions. *A* What will occur is that a current, the resultant of the two, taking into account their directions, will flow in the wire, a single current physically equal to the difference in the two originating in the two ends.

* * * * * *

Q I think in that last answer you used the term "current". Did you mean to use "current"? *A* I think the question said "current". That was my impression.

* * * * * *

A My impression was that "flow" was intended to refer to "current".

By Mr. Branch: *Q* I intended it to refer to power. [*1920*] *A* As I understand it you have been talking about active power, and I don't see that that would change the answer.

Q Your answer as to current would be the same if the question applied to the flows of power? *A* Changing the word "current" to "power"—yes.

Q Now, I think you have said in effect that it is a common thing for a circuit to contain a flow of reactive volt amperes or

out-of-phase current, which I understand is a similar thing, at the same time that there is a flow of active power. That is correct, is it not? *A* I didn't state it that way. A resultant flow of energy or current will occur which for some purposes, particularly with regard to the terminals, will have the same effect as though they flowed simultaneously. That effect will be quite different in the conductor itself, though,—in a transmission line connecting the points, the terminals of flow. I am speaking generally, and I want to be understood that I have no definite condition set before me.

Q It is possible to measure the reactive volt amperes, is it not, on a circuit? *A* That is regularly done.

Q And with your familiarity with this system, you know that there are such meters on the lines of The Connecticut Power Company, designated as C.P. 1 and 2, or the South Meadow substation of that Company? [*1921*] *A* I believe there are. I would caution you that in speaking of the measurement of the r.v.a., out-of-phase current, I am using that convention I spoke of by which engineers analyze a current into components, for the purposes of their convenience, not that there is a separate r. v. a. current flowing in that circuit, separate from the other.

Q Well, it is something that is measured separately, is it not? *A* The component of the total current which is called the out-of-phase component, is measured that way, yes.

Q And it is measured separately from the power, is it not? *A* Well, the meter indicates what that component would be. I don't know what you mean by "measured separately". It indicates that component as though there were no other component.

[*1922*] *Q* You measure reactive volt amperes on one meter, do you not? *A* Yes, that explains the situation. You do. My answer is yes.

Q Power is measured on a separate set of instruments, is it not? *A* Ordinarily, yes.

Q Now, Mr. Thomas, you gave certain answers in regard to the action of transformers. As I understand it, you said substan-

tially that there was no appreciable difference in the amount of energy which entered and left the transformer. Is that correct? *A* With the exception of the exciting energy and losses, that is, correct.

Q Which would amount to about what? *A* Well, in those power transformers we are talking about, my very rough estimate is less than two per cent for the actual losses, probably considerably less than that for the magnetizing energy.

Q Is not the same thing true with respect to the prime mover or the generator of electric energy? *A* Well, could I ask you to state what you mean by the same thing. There is quite a difference between the generator and the transformer.

Q I will confine my question to the generator. [*1923*] *A* You ask if the same thing is true?

Q Yes. *A* You mean that the energy that comes in and goes out is the same except for loss in exciting energy?

Q Of a negligible amount. *A* In broad terms, I think that is true.

Q I think you testified that there was no delay in the movement or transfer of energy, as I think you put it, in a transformer. Now, is there any delay in transferring the energy in the generator, from mechanical to electrical energy? *A* They are both substantially simultaneous, except that I would like to point out this difference, that in the case of the transformer, the exciting energy is alternating and goes in and out in a definite regime with regard to the voltage, and there is a certain regime in the flow in and out of the exciting energy of the transformer. In the generator, the ordinary type of generator, the exciting energy is represented by a field which is supported by direct current, and there is no flow in and out except when the generator is first excited and when it is next de-energized.

Q I think you said that no energy was stored in appreciable amounts in a transformer. Is any energy stored in appreciable amounts in the generator? *A* The condition is somewhat different. There is, of course, the fly wheel effect in the generator.

[*1924*] I don't know whether you had that in mind or not. There is quite an appreciable amount stored in the fly wheel effect of the generator.

Q Is it stored in such measure as to be available for commercial utilization? *A* Well, it is relied upon very heavily for stability of operation in large systems, if that is what your question inquires about.

Q Can that supply of energy be called upon for any appreciable time? *A* It can be called upon under proper circumstances until it is exhausted.

Q What is the ordinary time within which it is exhausted? *A* Oh, within a very short space of time. A few seconds, perhaps in an ordinary commercial system. That is a very general answer. You would have to give me more information.

Q Wouldn't it be a fraction of a second? *A* I say it depends on the numerical constants in the particular case.

Q How long would a machine deliver a full load with a substantial supply of energy from its fly wheel only? *A* A very short time, unless it is some specially designed machine.

Q A fraction of a second? *A* Well, that is hedged about by so many questions as [*1925*] to how much voltage drop could be allowed and still be considered operating, I don't think I could give a better answer.

Q Well, within reasonable frequency limits. *A* I was speaking about voltage drops. As the machine slows down, the voltage becomes lower and lower, and after a while it isn't useful. Now, just at what point would you consider a machine loses its utility?

Q Doesn't the frequency also drop there by causing the machine to lose its utility? *A* You are speaking of frequency in the electric circuit now? The frequency of the alternation of the circuit produced by the generator?

Q Yes. *A* Yes, it soon loses its usefulness.

Q Is it not true that it is not possible to store electric energy in a generator in commercial amounts for any appreciable time?

A If you are considering the function of parallel operation, and steadiness of service, I think it is possible. If you limit your question to the ability or utility of fly-wheel stored energy carrying a load unaided, why, then it isn't feasible commercially to use it for that purpose.

Q I mean the latter. *A* All right.

Q Wouldn't the interruption of the operation of a [*1926*] generator leave the entire system with which it is connected inoperative, assuming there is no other generator attached? *A* If there is no other source of power, that is a fair assumption.

Q And is not the flow of energy continuous and practically instantaneous in a generator? *A* You mean the flow of energy through the armature into the circuit?

Q From mechanical to electrical energy. *A* Yes.

Q Then, in all of those respects, the transformer and generator are substantially alike, are they not? *A* Well, I pointed out in the storing of energy there was a rather essential difference, and also in the nature of the exciting energy. Except for things of that kind, why, the different things you have spoken of occur in both types of apparatus.

Q As far as ability to supply a load in commercial amounts from stored energy, there is no distinction in that respect between a generator and a transformer, is there? *A* I pointed this out carefully. I don't need to change my answer. The question isn't quite definite enough.

Trial Examiner: Will counsel clarify the question for the witness.

By Mr. Branch: [*1927*] *Q* Well, subject to the restrictions which you stipulated, which I am not attempting to get you to change, there is no substantial difference in those respects between a generator and a transformer, is there?

Mr. Wahrenbrock: Mr. Examiner, as so stated, the question is exactly like the preceding question.

Trial Examiner: I don't think so. He has clarified it.

The Witness: Assuming that with regard to the stored energy in the fly-wheel effect of the generator, you are thinking only of the ability of the generator to supply prime power, and my reservation about the field coils, my answer would be in the affirmative.

* * * * * * [*1935*]

Q You have testified, I think, Mr. Thomas, that there were certain principles which underlay the conclusions which Mr. Miller reached in Exhibits 61 and 62. That is correct, is it not? *A* Well, I agreed with some principles. I think they were called, in the questions which seemed to underlie that.

Q And it was necessary to apply those principles in order to reach the conclusions which he reached as expressed in those exhibits, was it not? *A* Well, applying a principle, I would say that they were in line with the ordinary methods of an engineer in arriving at such problems. It hardly arose to the dignity of a principle, as I was using them, in examining Mr. Miller's studies.

[*1936*] *Q* Well, I think you stated, did you not, that one principle that was involved was that there could not be a simultaneous counterflow of energy in conductors such as are involved in circuits that we are interested in here? *A* Yes, that is correct, physically speaking.

Q And that principle is the fundamental basis of all of his conclusions, is it not? *A* I don't know what you mean by "the fundamental basis". Of course it is necessary that there should be no physical counterflow; and that was determined, to be perfectly sure of the conclusions that he reached.

Q If that principle were not applied, in other words, if you assumed just the contrary, Mr. Miller's conclusions would be without basis, would they not? *A* Well, I don't see how you can tell whether they were or not. That situation would have to be reexamined. I would not be prepared to say what the result would be.

Q But your endorsement of his result was dependent upon the validity of that principle, was it not? *A* Well, in checking his

result I assumed that there was no counterflow in that wire, if that answers your question.

Q Yes. But you could not, at least as far as you have gone at the present time, check those results if you assumed just the contrary of that principle, could you? *A* I wouldn't go as far as that. You are assuming [*1937*] something that is contrary to my conception. What the result would be I would have to explore. Just because that particular course of logic didn't satisfy a result doesn't prove that there wouldn't be some other course of logic that would do, as well.

Q You haven't any such course of logic in mind? *A* I didn't go further than I told you.

Q Now, I think that you testified in effect that there were instruments for determining the flow of energy and the rate of flow that you designated as watt-meters or watt-hour meters; is that correct? *A* I remember stating that.

Q Such meters, of course, do not show the source of the energy, do they? *A* Well, the meter itself doesn't have a marking on it to show where it came from. In Mr. Miller's case, the meter doesn't show red and blue or anything of that sort.

Q And of course there is not at Bristol or Winsted or any of the East Hampton District any instrument which shows the source of the energy that was received there at any time? *A* No, not that you can determine from the reading on the instrument.

Q And as a matter of fact it is impossible by examining or by any other observation that you can make of energy at a particular point, to know where it is generated? [*1938*] *A* I think that is correct.

Q And if energy from two sources is put on the same conductor, there is no physical method or experiment by which it may be determined what happens to the energy from the two sources, after they have both reached the conductor, is there?

* * * * * * [*1939*]

The Witness: Well, if I understand the meaning of the question, we do. That is a very common occurrence, and currents from

two sources go on to a circuit and run together, and mix there, and it is distributed. I think perhaps I didn't understand the question.

By Mr. Branch: *Q* I am afraid you did not. What I meant to ask was whether there was any method of physical observation by which you could tell what happened to the distinct sources, or to the energy from the two distinct sources, if energy from two different sources was put on a common conductor such as is involved in this case. *A* You mean what becomes of the energy from source A as distinguished from source B?

Q Yes. *A* I don't think your question brought that out, but I think I see what you mean. Well, if you are referring, to putting on a conductor, there is, energy enters the conductor and is carried through the conductor, and the energy from the two sources having a certain distinction, I think it is fair to say that energies having been mixed and merged, whatever becomes of the energy as a whole, the disposition of it is in equal proportions to those of the two component parts. That is a clumsy answer, I am afraid, but I think you know what I am trying to say.

[*1940*] *Q* Without meaning to criticize you, Mr. Thomas, I don't think you have answered my question, which was whether there was any physical means of determining that. *A* Well, your question is still very indefinite. You haven't stated whether you wished energy from the separate sources identified after they have left the conductor. I think if you will rephrase that question so I can answer it more successfully—

Q Let me ask you a specific question. Let us assume that there is energy put on the CP line No. 1 from Falls Village, and there is also energy put on that line from Hartford. There is no physical observation or no reading of any meter on that line that would enable you to determine at any particular point what proportion of the energy came from one source and what from the other? *A* Well, the instruments that are put on the line are only intended to read the total. So, of course—

Q And the— *A* So, of course, they wouldn't indicate parts. They are not intended for that purpose.

Mr. Wahrenbrock: Mr. Examiner, may the witness have time to complete his answer.

By Mr. Branch: *Q* I am sorry. Had you finished? *A* Yes.

[*1941*] Trial Examiner: Is the witness through with his answer?

The Witness: Yes.

By Mr. Branch: *Q* If I stop you at any time, Mr. Thomas, please tell me, because I don't want to interrupt you. And similarly, if there were a generating plant somewhere north of Hartford that was putting energy on that line, and the Hartford plant was also putting energy on the line, the same answer would be true, would it not? *A* Well, that is substantially the case I had in my mind.

Q In other words, your conclusions as to what happened when energy from two sources is put on such a line is based, is it not, upon analogy with other kinds of flow? *A* I wouldn't say based on analogy exactly. It is based on working hypotheses that engineers have of such things. Engineers have to deal with these matters all the time, and consequently they arrive at a working basis or hypothesis which is proved out by experience. Analogy is helpful and illustrative, but I wouldn't say we depend exactly on analogy.

Q Well, what other basis have you for the opinion which you expressed as to the proportions continuing all along the line, the same proportions as are put on the line? *A* Well, we are dealing there with intangible things, things which cannot be seen or noted directly, and I think we are forced to use these hypotheses, this method of work, which [*1942*] has proved out by experience.

Q Except for the purpose of such studies as are made in this case, it is not necessary or important, is it, to determine what happens in such situations? *A* Of course, it very often is not necessary or important to determine identity of component parts of a current. I wouldn't say it is never important. Sometimes it

occurs, but many problems don't involve that question, you are perfectly right.

Q What kind of a problem would involve that question other than the kind of a problem that arises under this Federal Power Act? *A* I think that question is a little too general to answer Mr. Branch.

Q Can you state any situation, or in any other situation, in which that problem is of any practical importance? *A* Would you mind stating what problem you have in mind now, because we have had some very general statements, and no specific instances. I want to make you a proper answer, and I would like to know just exactly what kind of a problem you have in mind.

Q I am talking about the problem of determining what happens as between energy from one source and energy from another source, where energy from two sources are put upon a common conductor such as the CP1 and 2 lines involved here. [*1943*] My question is, other than for purposes of this case and similar situations, is there any situation in which it has been of practical importance to determine what happens in that kind of a situation? *A* Well, of course, anybody who is examining the physics of those things, studying the theories, investigating for the benefit of the future, or people working in laboratories, studying the distribution of current in conductors, the effect of angles in a wire, or perhaps enlargements of a wire, or many questions of that kind; it would be necessary to investigate, I think, the mechanism by which this mixing occurs. That is a little general, but you are asking me to search around in a very wide field without anything very definite to go after. Perhaps you can ask me something else.

Q Did you yourself ever have occasion to determine the relative proportions of supply at a particular load, a situation similar to this, before you came to the Federal Power Commission? *A* The proportion of supply—you mean now identifying, you might say, by the equivalent of tagging?

Q Yes. *A* I don't remember this minute of any case other than the type of case you are speaking of.

Q And wouldn't you go even further than that and say you are sure there never was such a thing? *A* I wouldn't want to say that. I think probably there has been. I have been working in this field a long while, [*1944*] and you have no idea how many different situations arise.

Q Well, what method of determining that is there? *A* Well now, you mean—

Mr. Wahrenbrock: May we have that question put more specifically? The "that" certainly isn't clear to me as I am trying to follow the question.

Mr. Branch: It seems to me that it is quite clear.

Trial Examiner: I think it is clear to the witness. Does the witness understand what is meant by the question?

The Witness: Well, I think I can answer it. I don't know whether the answer would be satisfactory.

Trial Examiner: You may proceed.

A You mean is there any way of tagging the energy that comes from one source and mixes with another afterwards? I think I should have to say that would be done by inference and experience, rather than by direct observation.

By Mr. Branch: *Q* Well, leave out the inference for a minute, and what experience is there that would demonstrate that? *A* Well, as I said a while ago, engineers are handling these problems, and they work with certain hypotheses and they find they are correct, that they get the right answer, as a matter of experience. Now, isn't that what you mean? That indicates we know it by experience.

Q Well, is there anything in your experience that would negative, for instance, the proposition that if energy were [*1945*] put on a single conductor, such as the C.P. 1 and C.P. 2 lines from Hartford, we will say, from a source north of Hartford, that the energy from the source north of Hartford supplied the first loads until it was consumed and the energy from Hartford supplies the other loads? *A* Are you referring now to the 66 k. v. bus at the

South Meadow station belonging to the C.P. Company? You have introduced a new situation. I want to be sure I understand.

Q I didn't mean to introduce any new situation. Let's assume that there is a bus there that could be energized from Hartford, and also from some generating plant north of Hartford, C. P. Lines 1 and 2 are connected with that bus and there are loads to the west. Is there any experience that you have had that would enable you to say positively that the first loads south and west of Hartford were not supplied with energy from the generator north of Hartford before any of the Hartford energy was supplied to the loads? *A* Well, if I had a full specification of the physical set-up there, there might well be such a situation. There might not be, according to how it is connected.

Q Let's take the situation as it is, with which I understand you are familiar; let's assume that some station north of Hartford generates a certain amount of energy and according to your theory that energy reaches the 66 k. v. bus at South Meadow and at the same time Hartford is generating and some [*1946*] of its energy reaches that same 66 k. v. bus simultaneously. Now, my question is: Have you had any experience that enables you to demonstrate that the first load, which would be Middletown, south of Hartford, is not supplied entirely by the energy which is generated at this generating station north of Hartford? *A* Well, I think I have answered that. I stated in my direct testimony that the energy or the current received in that line would merge and they would be taken off proportionately. I think I have already stated that.

Q I am afraid I don't impress my point. I am not asking for your opinion, which you have made very clear, Mr. Thomas; I am asking you to tell me whether you have had any experience or demonstration from which you can say that the result, which I am assuming, could not occur. *A* I also testified that that is based on the hypothesis which I consider is proved by the experience of engineers. You are asking me if I have made a research of a model of such a situation, to see whether I can demonstrate those things. I would say I never have.

Q That is what I wanted. *A* I have never set up a model and gone through the movements of trying to investigate the currents' action flowing.

Q And you have never had an experience where the current, or where the energy was supplied by Falls Village, we [*1947*] will say, at the other end of the line, and Hartford, simultaneously? *A* Well, I feel that my opinion there is based on experience, as I have described; I never have set up a model of the Falls Village situation and tried it out in an experimental manner to see how it would work. That is true enough.

Q And you have not been called upon in any of the engineering work which you have done at least prior to the time you came to the Federal Power Commission to determine either of those problems as a practical matter, have you? *A* You mean as related to Middletown and Falls Village?

Q Or a similar situation. *A* Well, that is too broad. I don't know what I have done there.

* * * * * *

Q Mr. Thomas, I think you have stated that you had considerable familiarity with the facilities in the four different sections as to which you have testified. Will you tell me exactly what the basis for your familiarity with those systems is? *A* Well, do you mind mentioning the systems, just to avoid any waste of time?

[*1948*] *Q* Well, I think you have testified in regard to Groton, what we call generally the East Hampton Section, the Bristol Section and what we can call the Winsted Section. *A* As to the Groton Section, I visited Trails Corner substation and the Groton high-voltage substation, the Groton brick station and observed the lines around there, and I noted the line to Montauk, the 33 k. v. line to Montauk, in a number of places, and some of the tap-offs, and at Bristol I visited Bristol Mountain.

Q Wait just a minute. May I interrupt you. When did you make this visit to Groton? *A* The latter part of May, this Spring.

Q And up to that time you had not examined those facilities? *A* I had not examined them personally.

Q What was that about this 33,000 volt line to Montauk? *A* Excuse me, Montville, I should have said. There is another station, Montauk, in another place. I misspoke myself.

* * * * * * [*1950*]

Q At the time you made this visit to Groton, that substation which you have just characterized as the Groton-Long Point High-Voltage Substation had been largely dismantled, hadn't it? *A* Yes, I would say so. It wasn't in working order.

Q And there was not a continuous line from Trails Corner to that substation, was there? [*1951*] *A* I didn't visit all the lengths of the line, but I understood there had been some portions of it taken down.

Q Did you go to Trails Corner? *A* Yes.

Q Didn't you see that a large part of the line south or east of there had been removed? *A* I didn't trace the line far from the station. I think you are no doubt right.

Q Did you visit the little station right on the shore at Groton-Long Point? *A* Yes, that is the brick—Groton-Long Point station.

Q And you found that the jumpers had been removed, which connected the underground cable which went to Fishers Island, didn't you? *A* Yes. Generally called the "submarine cable", that went underground.

Q Generally, that substation had been dismantled, in so far as it contained facilities which were in any way used in connection with Fishers Island? *A* I think so.

Q Had you ever visited the facilities at Groton, at any other time? *A* Not that I remember. You said "visited"?

Q Yes. *A* No, I don't remember any other time.

[*1952*] *Q* Did you visit Bristol at or about the same time, May, 1941? *A* Yes.

Q Before we go to Bristol, how about East Hampton, did you go down there? *A* Yes.

Q And at the time you went down there, there was no connection between the G.P. lines and the facilities of The Connecticut Light and Power Company in the East Hampton section, was there? *A* That is correct.

Q Have you ever examined the facilities of The Connecticut Light and Power Company in the East Hampton section before that time? *A* Well, I have been through that section on other occasions a number of times. I never made any special examination of it. I presume I have seen some of the facilities on the roads, but only incidentally, in driving by.

Q And did you go to Bristol at or about the same time? *A* Yes.

Q And did you examine the facilities at Bristol? *A* I did.

Q You have referred in your testimony to synchronous condensers at Bristol. Did you find synchronous condensers at Bristol? [*1953*] *A* There was one synchronous condenser, not two, as I understand it.

Q Then, if you referred to synchronous condensers at Bristol, that was an error, was it not? *A* Well, I was not aware that I had referred to it in the plural. If it should appear that I had specifically referred to more than one synchronous condenser, it was an error.

Q And where was that synchronous condenser at Bristol located? *A* It was in the building, not in the outdoor substation.

Q And everything in that building was on the low-voltage side of the transformer which stepped the energy down from 66 k. v. in the outdoor substation; that is correct, is it not? *A* In the sense that there was no 66 k. v. voltage apparatus in there, I presume that is correct. Of course I didn't examine every corner to see whether there wasn't a line brought in for experimental purposes, or something of that kind, but I would agree with your question, I think.

Q In other words, the energy that went through that condenser at that time was energy at a comparatively low voltage, was it not? *A* The energy at that point was in a low-voltage circuit, yes.

Q Did you find any other condenser anywhere belonging to The Connecticut Light and Power Company? [*1954*] *A* I don't remember now, any belonging to The Connecticut Light and Power Company, except to be very punctillious, the Robertsville generators might have conceivably been used like synchronous condensers, if there was no water and they wanted to operate them for that purpose. I don't think you meant to include that in your question.

Q I was asking you, sir—and you may rest assured that your answer has been thorough. *A* I am glad.

[*1955*] *Q* Now, had you ever examined the facilities at Bristol before this visit? *A* Well, I make about the same kind of an answer. I have been in Bristol before, and I have seen the substation and have seen the lines, but I had made no special effort to examine them.

Q You didn't go to Bristol on Sunday afternoon in the course of a joy ride? *A* I think it may have been Sunday afternoon some time but—

Q What is the location of the Bristol substation in respect to the population center, and so forth? *A* Well, I think you have me stumped there.

Q Well, it is right— *A* It is more or less in the heart of Bristol. There are built up blocks around there, and apparently the feeders go in different directions.

Q Now, did you visit Winsted at or about the same time as you visited these other places? *A* Yes.

Q And that was in May, 1941? *A* That is right.

Q Had you ever examined the facilities of Winsted before that time? *A* I don't remember that I have ever visited in Winsted [*1956*] before, but I possibly may have.

Q Had you ever examined the facilities in Torrington about which you spoke before that time? *A* I had been in Torrington, and I probably have been by the station, but I didn't examine them. I would like to say now I am talking in a physical sense, that I haven't examined them. I am pretty familiar with facilities in the State. I have had occasions to study those systems a number of times, as long as you are limiting your question—

Q I am for the present, and I will give you an opportunity to explain your other sources of knowledge later. But I want to know what physical examination you made. You had never, I take it, examined or seen the particular facilities right in Torrington to which you have referred until you made this visit? *A* I hadn't examined them. I say I may have seen them.

Q Just in passing. *A* Just in passing, that is right.

Q Did you go along the road between Torrington and Winsted to look at the facilities between those points? *A* You mean last May?

Q Yes. *A* Yes. I went both ways.

Q And had you ever made a similar inspection before? *A* Not that I remember.

[*1957*] *Q* Then as far as physical inspection goes, except for some time when you may have seen them casually, when you were not particularly interested in them, you never examined any of these facilities until May, 1941, is that correct? *A* Well, you are putting that a little too broadly. I visited a good many power plants in Connecticut at different times, and if your word "facilities" is broad enough to include all the facilities of these companies, I don't believe that is true. If you are limiting it to these particular ones we are discussing, I think it is true.

Q I was, sir. Now, have you ever been employed by The Connecticut Light and Power Company, or any other company that owned any of these specific facilities that you have mentioned in these four sections. *A* I don't know just how to answer that. In my, what we call qualifications, I stated that I had made a certain study for a group of companies in New England, and this is

confidential matter as to subject matter, but I guess there is no impropriety in saying that is one of the companies interested. I wasn't employed directly by them, but they were interested.

Q Whatever that matter may have been, it did not involve a minute examination of such facilities as those which you have referred to in your testimony here? *A* Not a visual examination, no. Not a visual examin- [*1958*] ation.

Q Leaving out generating plants possibly, it didn't involve an examination of, or obtaining knowledge of the other specific facilities which you have mentioned here? *A* Well, to avoid a possible misunderstanding, I would like to make this statement, that in matters of the sort we are dealing with, the studying of generation and transmission and consumption of energy, the operations of utilities, the only knowledge ordinarily that is important is the knowledge of specifications, diagrams, and records, reports. The visual examination of the system is of very little importance. The generators are designed in distant cities, shipped complete, the transmission lines are designed in some office somewhere. The reports of operations, or the reports of meters—there is no use in looking at the meter, you can't stay there and read it—if you have the records of it, that is the thing that counts.

Now, I assume your question leaves out of account that sort of information. As for information gotten by visiting and examining these things, I have comparatively little other than that which I have already described.

Q Any studies you made at that time didn't involve going into the question of how many customers were served on particular lines in the East Hampton section, for instance, did it? [*1959*] *A* No.

Q I mean, your study was of a broad nature, and about all you needed to know was where the generating plants were and generally the connections between them, isn't that true? *A* And the generation, disposition of energy, and things in connection with it.

Q But not the study of the specific facilities such as you mentioned here? *A* Well, not the number of customers, nor where

John Jones's circuit was connected. Such things as that I was not interested in.

Q Now, you have testified at some length, Mr. Thomas, in regard to the operation of the transformer. I think nowhere in your testimony have you mentioned a matter, and that is whether the current on both the primary and secondary side of the transformer is the same or a different current. What is the fact? *A* The primary and secondary currents—now, I am ignoring the exciting current—are of equal value, but one passes in one direction around the core and the other passes in the other direction around the core, and they obviously can't be the same actual current. I am talking of the current, not the energy.

Q And if, however, you have an auto-transformer, there is an electrical connection so that it is the same current, is [*1960*] that correct? *A* Well, the auto-transformer is different in principle than the two-winding transformer. In the auto-transformer, as I explained at some length—

Q Can't you, without going into a long explanation, can't you just answer that question? Isn't it true that in the auto-transformer the current on both sides is the same current? *A* No, I don't think so. I would be glad to explain. If you insist on a yes or no answer, I will say no.

Mr. Wahrenbrock: May the witness be allowed to explain?

Trial Examiner: If he is unable to answer, that is a matter for the witness.

By Mr. Branch: *Q* Go ahead and give us your explanation. *A* What I had in mind was this: I have explained the principle of the auto-transformer, that where it is intended to raise the voltage of one circuit, supply circuit, to a higher voltage for a receiving circuit, we make use of a transformer only to obtain the difference in voltage between the two circuits. Now, the auto-transformer, as far as it acts as a transformer, is just like another transformer, and the primary and secondary currents are separate in the same sense. But when you apply the secondary current to the supply circuit to get the added voltage, there is necessarily a connection

between [*1961*] them. But the currents are just as distant as far as the transformer goes as they ever were. There is a connection between the primary and the secondary, but the current that goes to the high voltage receiving circuit from the connected lead of the supply circuit is not the same current that goes through the primary of the transformer.

Q Coming back to what you call power transformers as distinguished from auto-transformers, the voltage is different on the two sides of the transformer, is it not? *A* It may or may not be, according to the design.

Q But ordinarily, there is a change in voltage, is there not? *A* You are talking now of commercial transformers and not the simplified transformers?

Q Yes. *A* The Commercial transformer?

Q Yes. *A* Well, often, there is a difference in voltage. I think I said the auto-transformer is particularly useful—

Q I am not talking about the auto-transformer now. I am talking about power transformers. *A* I see. Well, in a great majority of cases there is a difference in voltage between the primary and secondary in power transformers.

Q There is also a difference in the amount of current [*1962*] as well as the actual identity of the current, is there not? *A* As I explained in connection with the simplified transformer in the commercial design, some of those ideal turns of the primary are combined in single larger wire turns, and so in the transformer there is considerable difference usually in the amount of current in the wire on the primary, or the low tension, I will say, from that in the high tension. As you know, the currents have inverse ratio to the voltage, ignoring exciting current.

Q Now, I am leaving out of consideration, sir, in this question, auto-transformers, and confining my question to what you call power transformers. Every one of the power transformers which you have mentioned in this system would make a change both in the voltage and the current, would it not—would effect a change? *A* Leaving out auto-transformers?

Q Yes. *A* Which are in fact power transformers. It is true. There is a difference in the primary winding from the secondary.

Q And the change is a substantial change in each case? *A* That is right.

Q And the change is a substantial change in the amount of current in each of the transformers, is it not? *A* Each of the transformers? Each of the windings? [*1963*] Just how is your question put?

Q I am leaving out of consideration auto-transformers. *A* Yes.

Q And I am making a general question that refers to these transformers which you have mentioned at the four places, in so far as there are transformers at any of these places, and I include Torrington, as well as Winsted, Bristol, the facilities which were connected with the East Hampton section, and the entire Groton section. And the general question applying to all of those transformers is, every one of those transformers effected a very material change in the voltage, did it not? *A* Yes. That is, the high tension voltages are very different from low tension voltages.

Q And it also effected a very substantial change in the amount of current, did it not? *A* Between the primary and secondary, yes, sir.

Q Now, you have given explanation as to the operation and effect of transformers, and you answered specific questions, I think, in regard to specific transformers at different places. I am still leaving out of consideration auto-transformers and merely referring to what you have called power transformers. Aren't those general explanations as to the operation and effect of those transformers true as to all power transformers? [*1964*] *A* Well, that is certainly a broad question. I don't have in mind any particular difference between those transformers you have referred to and other transformers but it is a broad question as you put it.

Q I am not trying to ask as to the effect which one of these particular transformers had at any particular place. I am confining myself to considering the general principle upon which the

transformers worked, and what goes on within the transformer, and the effect which it has in general. *A* I so answered.

Q And your answer as to these transformers would be just the same as answers to other transformers? *A* In a broad way, that is right.

Q And there has been no change in any of those matters in respect of such transformers within your entire experience, has there? *A* That is too general question to answer, but if you will make it more specific perhaps I can answer.

Q What I am trying to get at, and I think you will readily agree with me, I am not trying to get any broader statement than you are willing to make—but what I am trying to get at is, there is nothing about any of these transformers that is unique? *A* No, I have not intended to indicate that there was.

Q And what might be said about these transformers might [*1965*] have been said about any power transformer within the scope of your experience? *A* Of course, that is ignoring all questions applied to locations and particular areas?

Q Yes. *A* In general terms, that is correct.

Q I mean, the principle and operation of transformers is no different in Connecticut than in Kalamazoo, is it? *A* Lucky for us, it isn't.

Q And there hasn't been any change in any of these principles or methods of operation within the years over which your experience goes? *A* We have learned a good deal more about them, but I don't think transformers have changed in principle.

Q Now, Mr. Thomas, I come to another matter, although it is still relating to transformers, and I am still talking about power transformers. I think in your direct testimony you stated that it was not necessary to redesign or reconstruct a transformer to obtain a different voltage ratio, but that it was merely necessary to reconnect the turns in order to determine their ratio. Will you describe the reconnections which would be necessary to change the 13.8 k.v. winding of the transformer or transformers at Bristol substation, in order to obtain a voltage of 22 k.v., from this wind-

ing for the original k.v.a. capacity. [*1966*] *A* In my prior statements to which you refer, I was talking in terms of principle. You are asking me now in terms of a concrete transformer, to explain what the actual designer would do, or are you still talking as a matter of principle?

Q Well, without going into too much detail, I want to know in general what you actually would have to do. *A* The thing that you wish to do is to raise the voltage?

Q Yes. *A* From 13—

Q From 13.8 to 22. *A* The thing the designer would do would be to reduce, to take primary turns and connect them in parallel instead of in series. That would produce a higher voltage in each turn, because the applied voltage would be divided into a fewer number of parts, since the voltage on each turn in the secondary would be increased, the voltage of the number of turns that are there connected in series would be increased. Now, that is as a matter of principle.

Q Now, will you—I don't want to cut you short, but my question applied to this specific problem on this, a specific transformer in Bristol, and will you direct your answer to that. *A* Well, I had that Bristol transformer in mind. I said the designer, or whoever knows about the transformer, [*1967*] would reconnect the primary turns in such a way that there would be fewer of them in series. The current from the applied e.m.f. wouldn't go around as many times; that is, if it is—if the primary is 66 k.v., and you halve the number of turns the current went around, every turn would have twice as much voltage on it. If the volts per turn were 3 volts as it is wound, it might have 6 volts. You have cut the number of turns connected in the series in the primary in half. That would double the voltage that you would get on the secondary. It wouldn't be quite 22, but you correct the amount of change to the amount necessary to give you the voltage you want.

Q You have stated what the designer would do. Is such a reconnection and such a change as you have mentioned one that

could be handled with the operating personnel of the company there?

Mr. Wahrenbrock: Mr. Examiner, there is no basis that shows that the witness has any knowledge of what the operating personnel of this company can do.

Trial Examiner: You may answer the question generally.

The Witness: I have already explained that situation. If it is anticipated that there is any occasion to make such changes in the voltage, either primary or secondary, at which a transformer is to be used, it is easy, if these changes aren't too complicated, to provide so that the transformer can be connected in either way, and to have the facilities [*1968*] for making the changes on the outside of the transformer, which they frequently do.

Q Will you confine yourself to the particular transformer at Bristol with which I understand you are familiar. *A* As far as I know, if anybody made the attempt, one of the Bristol operators, to make the change in that particular transformer, he probably would have plenty of trouble, and the transformer would not operate efficiently, because it is not designed to be used in such a way. The efficiency of a transformer is a very finely balanced matter.

Q As a matter of fact, such a reconnection couldn't be done by a repair shop without detailed instruction from an engineer who is competent in design? *A* It sometimes happens that the change from 2 to 1 can be made, and it might in that transformer, although I don't know, for I haven't seen the inside. But in general, it is hard to make those changes unless they are planned ahead.

Q As a matter of fact, you wouldn't think, if you were consulted about such a matter, you wouldn't think of advising such change to be made without the close cooperation of the manufacturer? *A* As a matter of fact, the question of insulation, I think, would prevent making that particular change in that particular transformer. It would make too high a voltage. The secondary is not insulated for that.

[*1969*] *Q* Is it not a fact that such a reconnection would require the careful engineering design of a new winding and a major reconstruction of the transformer? *A* Well, that is a matter of definition, as to just what a major reconstruction is, but I wouldn't think of undertaking it on those transformers, as a practical matter.

Q And what you have said, I think you have said that there are transformers which are so made, that they can be used to reduce the voltage either to 110 volts or 220 volts, is that correct? *A* That is correct.

Q That means merely that there are two different low voltages that can be obtained from that transformer, isn't that correct? *A* You mean in commercial service?

Q Yes. *A* Yes, that is the effect.

Q But there aren't any other voltages that could be obtained readily from that by a simple process? *A* I remember once as a young engineer I laid out a transformer with three different voltages in the secondary. Those are the ones you practically use, the ones you plan for.

Q That is what I meant. *A* Yes.

Q Persons do plan for two, you young engineers plan [*1970*] for three, but the point is it is used only for the particular voltages that are planned for, and for which they are designed, isn't that true? *A* As a practical matter, in ordinary commercial service, that is correct.

* * * * * * [*1971*]

Q Mr. Thomas, I have asked you some specific questions about making changes in a specific transformer in Bristol; would your answers as to what would be involved in changes such as I have indicated also apply to making similar changes in any of the transformers which you have referred to, including not only those of The Connecticut Light and Power Company, but also those of the other companies which you have mentioned in your direct testimony?

Mr. Wahrenbrock: Mr. Examiner, I think that question is so broad as to cover much more ground than most of us listening to it can apprehend.

Trial Examiner: I don't know that it has a particular demerit if it keeps within the proper bounds of cross examination. Read the question back.

(The question is read by the reporter.)

The Witness: Shall I answer?

Trial Examiner: You may answer.

A As a matter of principle, as far as I remember the statements, I think that is true. Of course there are differences in voltages, and some other differences in the immediate settings, that might possibly affect the answer in some detail.

Mr. Branch: Thank you. That covers it sufficiently, I think.

[*1972*] By Mr. Branch: *Q* Mr. Thomas, do loads in general require reactive power as well as active power, particularly if there are induction motors on the load? *A* Yes.

Q Can electric power be delivered to the common type of induction motor at unity power factor, that is, without being accompanied by reactive power or reactive volt amperes? *A* You are leaving out of account the use of static condensers and things of that kind as not part of a motor? Ordinarily, certainly you require the exciting current, which is reactive power, to make an induction motor operative. I don't know that I just know what the import of your question is, but I can answer its terms that way.

Mr. Branch: Your answer is sufficient.

By Mr. Branch: *Q* Can you say from what sources the reactive volt amperes are supplied to the loads of The Connecticut Light and Power Company, which were connected to the C.P. 1 and C.P. 2 lines during the 21 days involved in Mr. Miller's study, which is Exhibit 61 and Exhibit 62?

Mr. Wahrenbrock: I would like to have that question read back again, Mr. Examiner.

Trial Examiner: The question will be read for the benefit of Commission Counsel.

[*1973*] (The question is read by the Reporter.)

A If I had the additional data necessary, the reactive kilo-volt-amperes could be handled in the same way as the active.

By Mr. Branch: *Q* But his studies did not give any indication as to that matter, did they? *A* I believe he didn't attempt to go into that subject.

Q Now, in particular can you say from what sources the Winsted and the Bristol loads received their required reactive volt amperes which accompanied their active power supply during those 21 days? *A* Not with the data before me.

Q Could those loads at Winsted and Bristol, as they have existed since January 1, 1937, to make a time definite, have been supplied with energy at unity power factor, that is, with energy accompanied by no reactive volt ampere hours?

The Witness: May I have that question again?

Trial Examiner: The reporter will read the question to the witness.

(The question is read by the reporter.)

A If you have reference to the transmission line, and proper capacity in synchronous condensers exist, it would be possible to have the energy supplied at unity power factor over the transmission line, but broadly speaking, as I think [*1974*] your question is intended, I would say no.

By Mr. Branch: *Q* Mr. Thomas, I am going to call your specific attention now to particular places in your testimony.

On page 1595, you answer this question as follows:

> "*Q* As a matter of common and accepted engineering practice can the flow of electric energy between a source of supply and a load be detected?"

And you answered, in substance, that that was done regularly in service by suitable instruments, called electrical watt-meters.

The electrical watt-meter does not detect the source of the flow, where there are two different generators attached to a line and are acting in parallel, does it?

Mr. Wahrenbrock: Mr. Examiner, I am going to object to that question in the first place because respondent's counsel has not accurately reproduced the substance of the testimony referred to.

Mr. Branch: I think I have, but in order to obviate any doubt, I will read the whole thing word for word. I am now quoting from page 1595:

> "*Q* As a matter of common and accepted engineering practice can the flow of electric energy between a source of supply and a load be detected?
>
> "*A* Yes. That is regularly done in service.
>
> [*1975*] "*Q* How?
>
> "*A* By suitable instruments.
>
> "*Q* What is a common type of such instrument?
>
> "*A* The electrical watt-meter."

That was your testimony, was it not, Mr. Thomas?

The Witness: As I remember it, yes.

By Mr. Branch: *Q* Now, you did not mean to say, or indicate, did you, either by that testimony, or any other testimony, that a watt-meter would determine the source of supply as between the two sources of supply, if the loads were connected with two generating plants which are acting in parallel? *A* I don't think the answer purports to show that. It wasn't intended to.

Q All right. I make my question broader. It is a fact, is it not, that the electrical watt-meter would not do that? *A* I have already testified to that fact.

Q You mean you agree with my statement? *A* Yes, that a watt-meter measuring a combined flow from two sources does not indicate which part of that combined flow came from the individual sources.

Q And there is no other instrument known which does, is there? *A* Not that I know of, not in this situation which you

[*1976*] are putting up. In some detailed situation, I might answer, perhaps, a different way.

Q I am turning to page 1285, and Mr. Wahrenbrock, I am going to vary my usual practice by inviting interruptions. Rather than read all of this answer and so forth, I am going to pick out parts. After I have finished my question, if you feel that I haven't correctly represented his testimony, will you so state, and then I will read the whole business, if I feel there is any basis for it, because I am most anxious to represent the testimony fairly, in a way that will be beyond any possible criticism.

Mr. Thomas, I think you testified in substance, as follows:

That where electric currents or electric energy comes from two sources and enters a conductor and traverses the conductor to some further point, the usual working concept or hypothesis is that the two currents mix and commingle in an intimate way and that any portions of the mixed current drawn from the conductor at various later points will have about the same proportions of the two currents as was contained at the point of mixing. Is that in substance your testimony? *A* That is as I remember it.

Q There you did expressly limit it, did you not, to a usual working concept or hypothesis? A Well, I don't consider that a limitation. I made the statement that way to show you what was in my mind. I don't see [*1977*] that that is a limitation, exactly.

Q Well, a hypothesis means something that is accepted often without proof, does it not? *A* Yes, that is a fair statement.

Q And this is an instance where you must accept something that cannot be proved, in order to come to that conclusion, is it not? *A* No, I wouldn't go as far as to answer that question in the affirmative. I stated the fact that that hypothesis has been used by so many people for so long a time with successful results, to my mind, is proof that it is, within the range in which it has been used, correct and proved.

Q Well, I think you have said though that until the Federal

Power Commission had this problem before it, there was no occasion for considering that particular problem, didn't you? *A* Well, you have stated a much broader conclusion, I didn't intend to state that that general principle had been considered only in the case you speak of. That is arising in men's minds all the times.

Q Well, what particular situation has arisen outside of this that would call upon engineers to determine that question? *A* Oh, I was thinking of the hypothesis, the conception, in a man's mind. An engineer, looking at a problem where two currents come into the same conductor, and pass along, and im- [*1978*] mediately in his mind is the picture of the mixture. I don't bear in mind just at this minute any case where it was necessary to make a logical proof of the point that you have raised. I think I stated that before.

Q Now, why did you qualify your answer by saying that the portions of the mixed current drawn off from the conductor at various later points would have about the same proportions? *A* Well—in a general conversation of this kind it is so easy to state something which may be applied in other conditions that I like to be careful. If we were discussing the ultimate nature of matter and going into the mathematics of physics, we might get to some points where we are distinguishing between what is theoretically perfect and accurate, and what is substantially and practically correct, and I wanted, for fear this would lead into some theoretical situation, to guard against having said that this was of the nature of a mathematical equality or proportionality.

Q Well, how would you go about determining the difference between the proportions? *A* I have no such thing in my mind.

Q You don't know of any method of determining that, do you? *A* Well, I wouldn't answer that without giving it a little thought. You are asking rather a searching question, and I would have to have a little time.

[*1979*] *Q* You never have considered that question, have you?

A Do you mind restating the question, as long as you are pressing it? I would like to be sure that I know just what you have in your mind.

Q Well, I mean the question as to the variation between the proportions, between the two currents, that entered the conductor and the proportions of the two which supply any particular load. *A* I don't think I have ever made any effort to determine variations in the proportions in a case like that.

* * * * * *

Q You have stated, Mr. Thomas—I turn to page 1608 [*1980*] Mr. Wahrenbrock, because I am going to paraphrase and give in substance,—but you have agreed with the conclusions of Mr. Miller in the study of the power question. I quote now:

> "Relying upon a well-known axiom of the flow of current in electric circuits, namely, that the current can flow in a single circuit only in one direction at any instant of time, and that is, what might be called simultaneous counterflow cannot exist. This is equally true of energy. This fact is known by experience in electric systems."

I have finished quoting your testimony. What experience in electric systems establishes any such principle as that? *A* Well, in the first place, as I have already explained this fact, that hypothesis, that way of looking at it, whatever you call it, has been used so long by so many people, agreeing with observed result, it seems to me that established by experience.

Q Is that all you meant by "establishing by experience?" *A* Well, analysis, I think, will show that it will be contrary to experience that anything else should exist, or rather, that counterflow of two currents at the same time could exist in one circuit. For example, if we had one ampere going one way in a circuit and 2 amperes going the other way, if you can imagine such a thing, we would at least have the energy loss in re- [*1981*] sistance in one, due the current of 1 and energy lost in that same conductor

due to the flow of the other, due to the current of 2, making a total, we will say of 3, where as the actual fact occurs we have only the different flowing of one, and the energy loss of one. That would be a physical thing you can measure, and by experience you would know that the loss you measured couldn't be due to two currents flowing at the same time in the same wire. Maybe I didn't get the drift of your question.

By Mr. Branch: *Q* As a matter of fact, in engineering practice, is the matter not calculated both ways, one by just considering the flow as in a single direction and the other by considering the flow as in opposite directions and taking the difference, the algebraic difference? *A* It depends on what you want to accomplish. If you are looking at the physical action, you have got to take it as it is. If you are trying to find out whether you have got capacity enough in the circuit, or what the loadings might be on certain generators, something which is unrelated to the circuits in between, it might very often be convenient just to assume that it did flow both ways in the same wire, but always, you have got to do it with the caution that you are playing with fire—it might be all right and it might not.

Q How do you know that is a physical action?

Mr. Wahenbrock: I didn't hear the question.

[*1982*] Trial Examiner: Will you read the question back for the benefit of Commission Counsel?

(The question is read by the reporter).

A Well, in the first place I have already pointed out the fact that by following along such a hypothesis, we get successful results, but I think you can go further than that and see that it must be so.

Suppose we have a current flowing in a wire, and we assume an imaginary division line down the middle of that current in the wire, and we assume that the current in half of it is flowing the other way, we have come to an absurd position, because that current flows because there is something that makes it flow. Now, the thing that makes it flow in one half makes it

flow in one direction and the thing that makes it flow in the other half makes it flow in another direction, but we started with a whole current, and only one cause of flow, so it seems to me there isn't any way you can avoid that conclusion.

Q Is the entire flow of energy within the wire? *A* Are you talking theoretical physics now or do you mean, if I observe the wire, I wouldn't find any current on the outside of it? Are you speaking of energy?

Q Answer that as broadly as you want, sir. *A* Well, as far as the ordinary engineering problems are concerned, I look at it this way. The flow of energy is connected with the flow of current. That must occur in the [*1983*] presence of voltage, of course, before we have any energy. Now the current is pretty clearly confined to the conductor. There are conditions, of course, when there is a slight leakage from the conductor, but ordinarily it is confined to the conductor. Now, as to what you mean—where does the energy flow—a practical engineer in the kind of problem we are having here does not really concern himself about that, he has to control the current. If you want to go into the theory of it, well, that is another matter. I have heard them talk about it and I have read about it some. I don't undertake to know all about the theory of physics, electricity in physics. I am interested in what they say about it.

Q Well, is that as far as your studies have gone? *A* No, I answered carefully in terms there.

Q I call your attention to a question which I think the answer is somewhat typical of. The question was asked in these words, page 1609 and 1610:

> "*Q* Directing your attention to the instances as shown by Mr. Miller, in which electric energy requirements for the Winsted, Bristol and East Hampton districts of The Connecticut Light and Power Company were supplied in whole or in part from Massachusetts, will you please describe in a general way the system of facilities by which that was ac-

complished and state the functions performed by the several parts of that system, respectively?"

[*1984*] Your answer listed certain facilities and then, in the course of this you said,

> "The 66 k. v. lines, C. P. 1 and 2, and the 66 k. v. branch lines connecting therewith, together with the 66 k. v. step-down transformers, and all synchronous condensers to which they are connected" and so forth "are facilities for transmitting electric energy to the corresponding stations," and so forth.

Now, in some of your answers you said they were facilities for transmitting electric energy from Massachusetts or Massachusetts electric energy. Are they not facilities for transmitting or distributing, as the case may be, electric energy from Connecticut?

Mr. Wahrenbrock: Mr. Examiner, I object to that. No basis has been shown that any study has been made by this witness or of Mr. Miller's study, to which this witness referred, with reference to the use of these facilities for supplying energy from Connecticut sources.

Trial Examiner: I believe the question is in order. The objection is overruled.

The Witness: I understand the intent of your question. Of course, when I say "mixed energy" was transmitted over these circuits, that included some energy from Connecticut.

By Mr. Branch: *Q* In the course of all of those questions that were asked you to characterize and describe the Massachusetts, did [*1985*] you at any time refer to Connecticut energy, or there being facilities for Connecticut energy, except this one occasion, referring to the circuits known as 122, 123 and 124 at South Meadow; you said that since the change of March of this year those circuits may be such facilities, if at times they are transmitting mixed Massachusetts and Hartford energy, but such facilities evidently refer to facilities for transmitting Massachusetts energy, so I don't think even that did. Why did you not at any

time in your answer mention or consider that the facilities were facilities for transmitting or distributing Connecticut energy?

Mr. Wahrenbrock: Mr. Examiner, I must object to that question. It certainly does not direct the witness's attention with sufficient definiteness to the various facilities involved and the various statements made with respect to those facilities, so that any answer that can be given can be assumed safely to be based on a real understanding of the facilities referred to. The question is so broad as to be highly ambiguous, regardless of an assumption which might be made at the moment, that we understand it.

Trial Examiner: I think perhaps the witness had better state what facilities he refers to, in his answer, if he has any question in his mind as to what is conveyed by the question.

The Witness: Well, it seems to me that every time I have said facilities were facilities for transmitting mixed energy, [*1986*] it goes by inference that they transmitted Connecticut energy. I don't believe I understand what you are trying to get at.

[*1987*] By Mr. Branch: *Q* Did you in a single place say they were facilities for transmitting mixed energy? *A* I don't remember the language. I assume that is—

Q Why did you not mention Connecticut energy in your answer? *A* I don't know that I was asked. I wouldn't have hesitated to say they were capable and were transmitting Connecticut energy if I had been asked that.

Q In various places you said that facilities were facilities for transmitting Massachusetts energy. What did you mean by saying they were facilities for transmitting Massachusetts energy?

Mr. Wahrenbrock: Mr. Examiner, let us have the question unambiguously enough to identify the places.

Mr. Branch: Oh, there are a dozen places where he said that.

Trial Examiner: I would suggest, Mr. Branch, that you might refer to some particular place, then if you want to ask the second question as to generalities—

Mr. Branch: Very well. I will find a particular place. It will take me a few minutes. No, here is a question, on page 1289:

> "*Q* Directing your attention to the instances shown [*1988*] by Mr. Miller, in which electric energy requirements for the Winsted, Bristol and East Hampton districts of The Connecticut Light and Power Company were supplied in whole or in part from Massachusetts, will you please describe in a general way the system of facilities by which that was accomplished, and state the functions performed by the several parts of that system respectively."

You then gave a long answer, and in the course of it, you said this, at the bottom of 1611:

> "Your 13.8 substation buses and equipment at the Middletown sub-station, and the 13.8 k. v. line, crossing under the Connecticut River by submarine cable, and leading to poles 110 in Portland, and before its removal in 1939, the extension of that 13.8 k. v. line to East Hampton, Colchester, and Leesville, and their step-down transformers are facilities for transmission of Massachusetts energy to East Hampton, Colchester, and Leesville."

What did you mean by saying "facilities for transmission of Massachusetts energy" to those points?

Mr. Wahenbrock: Mr. Examiner, I object to that question. It is apparent from the way in which it is phrased that the answer which the witness gave on direct examination was directly responsive to the question which had been put.

Mr. Branch: And I put the question which was put and asked what he meant.

Trial Examiner: The witness may answer the question.

[*1989*] The Witness: I meant what I said there. If it will make it any clearer, I will say I had no idea of excluding the function of transmitting Connecticut energy from the functions of those facilities.

By Mr. Branch: *Q* Why did you never in the course of your testimony in those questions mention the function in regard to Connecticut energy? *A* Well, where—

Mr. Wahrenbrock: I am going to object, because it appeared in the question to which he referred that the answer made was directly responsive, and it is, I suggest, improper to ask the witness why he didn't go further and make an answer which would not have been responsive to the question which was put. I am going to object to the question.

Trial Examiner: The original question, Mr. Wahrenbrock, included the transmission of Connecticut energy?

Mr. Wahrenbrock: No, sir.

Mr. Branch: He is referring generally to these studies, sir, to instances as shown by Mr. Miller, and so forth, in which The Connecticut Light and Power Company were supplied in whole or in part from Massachusetts, and the studies, of course, do indicate that there were several diagrams illustrating a good many hours in which Mr. Miller was substantiated, to the extent he was, by this witness, who stated the energy [*1990*] was supplied in part from Massachusetts.

Trial Examiner: Isn't it true, the question being "During the time when it was supplied in whole or in part", if it was supplied in whole by Massachusetts energy, the suggested addition would not have been responsive to the question.

Mr. Branch: I think it would have, but I am trying to find out. It seems to me that is for the witness to explain. I say he was shown all these charts, some of which had red lines and some of which had blue lines.

Mr. Wahrenbrock: Mr. Examiner, the question did not ask for him to describe facilities by which any of these loads might have been supplied by Connecticut energy. It asked only how to describe the facilities by which these loads were supplied from Massachusetts. That is what the witness did. The reply he gave was responsive.

Now, I wish to make the further objection to the pending question that it is not limited to the specific instance to which Mr. Branch has referred here, that is, page 1291 of the transcript, but as phrased by Mr. Branch it has a catch all which is very indefinite and ambiguous.

Mr. Branch: Rather than take any more time on that, I am not anxious to do anything that could possibly be considered as ambiguous, but if it is, I suggest it is the witness and not Mr. Wahrenbrock who should suggest it.

[*1991*] By Mr. Branch: *Q* To the extent that facilitie in your opinion did have Connecticut energy on them, were they facilities for the transmission or distribution of Connecticut energy? *A* Facilities capable of such transmission, yes.

Q Why do you say "capable"? *A* I only qualify that so that it shan't mean exclusively for the transmission of Connecticut energy.

Q You didn't qualify your answer when you were stating that they were facilities for transmitting Massachusetts energy, did you, Mr. Thomas? *A* The questions as I remember in my testimony on that subject all relates to the studies made by Mr. Miller, and those studies were made specifically to examine the flow of Massachusetts energy without Connecticut, and in answering them I assumed that that was the information that was desired.

Q In other words, you were just trying to give this a Massachusetts color rather than a Connecticut color, was that it? *A* I think that is your suggestion, and not what was in my mind.

Q You didn't mention Connecticut at any point in your testimony, did you? *A* Well, that is a broad question. I didn't feature the transmission of Connecticut energy because it seemed to [*1992*] me that that was outside of the purpose of the questions.

Q All right. Now, what did you mean by saying that these were facilities for transmitting Massachusetts energy, any more than they were facilities which in your opinion could be used for transmitting Massachusetts energy? *A* Well, just the difference between the possibility and the actual fact. That is all.

Q You didn't mean, did you, that they were specifically designed for Massachusetts energy? *A* No, I didn't mean that.

Q And you didn't mean, did you, that the design or operation of any of the facilities belonging to The Connecticut Light and Power Company would have been in any respect different if there had been no connection with Massachusetts? *A* Well, I think it is too far to say there wouldn't have been any change in detail. You understand that distance and all those things come into design. But maybe as you understand the question I could answer in the affirmative.

Q But you can't point to any specific thing which you have characterized as a facility for transmission of Massachusetts energy or a facility for transmission—for distribution of Massachusetts energy belonging to The Connecticut Light and Power Company which would have been different if there had been no connection with Massachusetts, can you? *A* Well, the Agawam lines are part of these facilities.

[*1993*] *Q* I say belonging to The Connecticut Light and Power Company. *A* Oh, The Connecticut Light and Power Company. I beg your pardon. I think I had better hear that question again, if I may.

Trial Examiner: The reporter will read the question for the benefit of the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: Well, I didn't design those lines or know just what basis—I don't think of any specific thing that would have been different, but I wouldn't want to say that if Massachusetts energy had never been considered there wouldn't have been some change. I don't have anything in mind, but it is conceivable that it might have been done.

Q But you made a careful study of these facilities of The Connecticut Light and Power Company which you have characterized as facilities for transmission at least? *A* I have examined the

physical facilities, yes. Not as to their history, nor why they were laid out as they were, or anything of that kind.

Q I understand. You don't mean to express any opinion as to the function for which any of these facilities was actually designed? *A* No, I didn't say that. I meant to say I don't know [*1994*] the numerical importance placed on this or that, or just how they arrived at the voltage, or just how they arrived at the size of the conductor. I know what they have arrived at, and how they use it, but I don't know whether they took into consideration taking power from north of the State. I just don't know.

Q Now, in your testimony, you were several times asked questions of which the following is an example. I refer to one on page 1628. First let me see if it was answered. Yes, it was apparently answered on page 1631, in the affirmative.

> "In so far as the energy so transmitted has been shown by Mr. Miller to be transmitted from Massachusetts and consumed at points in Connecticut, in your opinion are those facilities facilities for the transmission of electric energy which is transmitted from Massachusetts and consumed in Connecticut by persons other than transmitters thereof?"

You answered that question and some similar question in the affirmative, or you used the term "persons other than the transmitter thereof". In what sense did you mean "a person other than the transmitter thereof"? *A* I merely had in mind the fact that these are electric utilities, and they distribute energy to the public, and many, many customers. That is the ultimate destination of the energy.

[*1995*] *Q* Well, whom would you consider the transmitter in the case of, we will say, energy which you say went—came from Massachusetts, and which you have stated, according to your Miller, went to Bristol at certain times? *A* Any person—if you say person, owner who had a hand in the transmitting of the energy.

* * * * * * [*1996*]

Q I think this is clear, is it not, that there is no electrical connection between the two coils in the transformer? *A* Except in the case of the auto-transformer, in which case it may be outside.

Q You do not understand, do you, that The Connecticut Light and Power Company ever owned or operated the cable from [*1997*] the little substation on the shore at Groton Long Point and Fishers Island? *A* No, I never had any idea that they did.

* * * * * * [*1998*]

Q You came up here on a field trip in 1941, in May, didn't you? *A* Yes.

Q And you examined not only the facilities of The Connecticut Light and Power Company, which you have mentioned, but various facilities at other times, did you not? *A* Yes.

Q And your travels took you from the New York State line to the Rhode Island State line, did they not? *A* I believe so.

Q And did you discover any facility which had to do with transmission or distribution of electric energy owned by The Connecticut Light and Power Company outside the State of Connecticut? *A* I believe not, although I am not perfectly clear about the stub ends of some low voltage lines. I am not perfectly clear whether I was told that some company had supplied a retail customer across the border or something of that kind; I just don't remember it.

Q Nothing that you regarded as a facility for the trans- [*1999*] mission of electric energy? *A* No.

Q And how long have you been familiar with the connections of The Connecticut Light and Power Company? *A* Well, that is such a general question. Of course, I have known of the company for a good many years and some of their connections. I never knew them all. I don't see how I can make any better answer.

Q When did you make this study that you said included some kind of consideration of the facilities of The Connecticut Light and Power Company? *A* I think that was in 1924.

Q I am confining myself now to August 26th, 1935 and periods subsequent to that. As far as you know did The Connecticut Light and Power Company ever have any facilities which you would characterize as a facility for the transmission of electric energy which crossed the State line and was actually owned by the Connecticut Light and Power Company at a point beyond The State line or at the State line?

Mr. Wahrenbrock: Mr. Examiner, I object to that same question previously objected to and I object to it for the same reasons I previously did.

Trial Examiner: The objection is overruled. The witness may answer.

A As I already answered, I know of no such facilities cross- [*2000*] ing the State line.

Q Or connecting at the State line with a facility in any other company? *A* That is also true.

* * * * * * [*2004*]

Redirect Examination by Mr. WAHRENBROCK.

* * * * * *

Do you mean to indicate by your testimony that the source of energy cannot be ascertained where, as at South Meadow, there are several meters on several circuits, and you can obtain readings for the same periods of times on those several circuits from those several meters? *A* I have several times stated that from the reading of a meter, it is not possible to locate the source of the current, but the reading of the meter, taken in conjunction with the existing circuits, and with the readings of other meters, usually [*2005*] does make it possible to trace the sources and flows of current. Meter reading requires further support from the knowledge of the circuits in which the meter and the current are associated, to determine sources and dispositions of energy.

Q And is what you have said true of electric energy as well as current? *A* Yes.

Q In his cross examination, Mr. Branch asked you, and you replied, with respect to reactive energy. I wish to ask whether the reactive energy to which you referred, constitutes any part of the electric energy purchased, received and paid for by The Connecticut Light and Power Company at any one of the several delivery points referred to in your testimony on direct; that is, Bristol substation, Pole 110 and Torrington? *A* No.

Q In your cross examination, in referring to connections, or the absence of connections between coils in transformers—I believe in two-winding transformers—I think you said something about an electrical connection. By "electrical connection" did you mean a metallic connection? *A* Yes, such a connection as would permit the flow of current from one conductor to another, in the usual manner.

[*2006*] *Q* The flow of current from one conductor to another. *A* Right.

Vol. III

TRANSCRIPT OF RECORD

(Pages 639 to 1197)

Supreme Court of the United States

OCTOBER TERM, 1944

No. 189

THE CONNECTICUT LIGHT AND POWER COMPANY, PETITIONER,

vs.

FEDERAL POWER COMMISSION

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

PETITION FOR CERTIORARI FILED JUNE 23, 1944.

CERTIORARI GRANTED OCTOBER 9, 1944.

APPENDIX TO BRIEF FOR PETITIONER.

VOLUME III, pages 639 to 1161.

IN THE

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

No. 8341.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

ON PETITION TO REVIEW ORDER OF FEDERAL POWER COMMISSION ENTERED MAY 15, 1942.

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* * * * * * * [*2011*]

CALVIN T. HUGHES,

a witness called on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Will you please state your name, Mr. Hughes, and your address, for the record? *A* My name is Calvin T. Hughes. My home address is Milldale, Connecticut. My business address is 250 Freight Street, Waterbury.

Q What positions have you held with The Connecticut Light and Power Company, and what were the duties of those positions? *A* Cadet engineer, which consisted of making small studies of different parts of company property. Assistant engineer, which was the next step above, with a little more responsibility; duties involved layouts of substations, maybe some distribution lines, some transmission work, and the usual routine duties that go with operating. I was for a while, [*2012*] had title of designing engineer, which was along about the same lines, with maybe a little more specific responsibility for laying out of different projects, jobs, lines, substations, or what have you. Then I was electrical engineer with the company, which broadened my duties somewhat, to include more complicated problems, and problems of a more general nature affecting the operations of the whole company. Then I was a general engineer, which position involves responsibility for certain lines of work. As used in our company, a general engineer is capable of carrying out a whole large project, including its design and the supervision of its construction and placing in operation, and looking after its operation after it is put in service.

And at present I am general superintendent, in which job I am responsible for the operating, construction and maintenance matters throughout the property, with particular reference to the

plant, physical facilities, means and methods for getting work done, and all that nature of thing.

Q Does that complete your statement of the positions you have held and the duties of those positions? *A* In the company, yes.

Q How long have you been general superintendent? *A* Since March, 1939, or thereabouts.

Q And how long have you been with the company and its predecessors in all? [*2013*] *A* Since December 18—or December 19, 1918.

Mr. Wahrenbrock: I show respondent's counsel the power system statement for the year ending December 31, 1937, made by The Connecticut Light and Power Company, covering its main system, filed August 4, 1938, I believe, and direct respondent's counsel's attention to the map which is a part of that power system statement, as a preliminary to showing it to the witness.

(Document handed to Mr. Branch.)

Mr. Branch: All right.

By Mr. Wahrenbrock: *Q* Directing your attention to the map which is a part of that 1937 power system statement, I will ask you if the description of the Montville to Groton Long Point line on that map is accurate as of the date of that map, which is, I believe, March 1, 1938. I refer to the legends and the columns at the left-hand side of the page. *A* I believe it is.

Q Where was the Borough of Groton load usually carried? What generating plant usually carried it? *A* Montville usually carried it.

[*2014*] *Q* What is the capacity of the Montville plant? *A* It is 55,000 kilowatts.

Q 55,000? *A* Kilowatts.

Q What is the largest sized unit in the plant? *A* Well, the largest unit is a steam turbo-generator which has, I believe, a nominal rating of 25,000 kilowatts, but can produce somewhat in excess of that.

Q The name plate rating is 25,000 k. w.? *A* I believe it is.

Q Directing your attention to that map in that same power system statement again, I will ask you if the description in that map of the Borough of Groton substation is properly set forth? *A* The print is so fine my glasses don't quite pick it up. (Witness examines document.) Well, it is indicated here as a transmissic . substation. I didn't prepare this map and your question is, "Was it correctly shown on here?"

Q As of the date of the map. *A* Well, I think it could be either considered correctly or not correctly. It could be classified as a distribution substation, I think, logically, if that was desired. It is classified here as a transmission substation.

Q And you wouldn't say that was incorrect? *A* Well, that is just a question of opinion.

[*2015*] Mr. Wahrenbrock: You have furnished me these three photostats of a memorandum from Mr. Perkins to Mr. Knowlton, Mr. Branch dated June 21, 1935. I only took three copies from you and left the remaining ones with you.

I hand the reporter a photostat of an office memorandum from R. W. Perkins, vice president, to R. H. Knowlton, vice president, dated June 21, 1935, and a similar copy to the Examiner, these documents being copies furnished me by respondent's counsel in response to my questions, being copies of data produced in response to the subpoena duces tecum.

The memorandum has attached to it a rough sketch.

I ask that that memorandum and attached sketch be identified as Exhibit No. 66 for Identification.

Trial Examiner: It will be marked Exhibit No. 66 for Identification.

(Document referred to was marked Exhibit Number 66 for Identification.)

By Mr. Wahrenbrock: *Q* Mr. Hughes, I show you Exhibit 66 for Identification—

Mr. Branch: May I see it? I don't seem to have a copy of the whole thing.

Q I direct your attention, Mr. Hughes, to the first paragraph of that memorandum, which reads as follows:

> "To make our deliveries to the Borough of Groton absolutely clear under the terms of the contract, I think I will have to [*2016*] refer you to the attached very rough sketch and then call your attention to the wording in paragraph 3 on page 2 of our contract with the Borough, emphasizing the words 'At the above mentioned substation of the Power Company at Trails Corner, in the town of Groton; the end of its existing 33,000 volt transmission lines at Groton-Long Point, and such other points as may be mutually agreed upon.' "

I stop quoting from the memorandum and ask you, Mr. Hughes, if at the date of this memorandum, June 21, 1935, the 33,000 volt line to Groton-Long Point was commonly referred to by the officers and employees of the Company as a transmission line. *A* It was.

[*2017*] *Q* Now, I refer you to the third paragraph of the same memorandum, the second sentence of which reads as follows:

> "At the Groton Long Point substation the voltage is transformed to 6600 volts, and from this point a single circuit to the extreme south end of the Groton Long Point and the cable delivers the energy to Fishers Island at 6600 volts,"

and I end my quotation at that point and ask you whether it was commonly known to the officers of The Connecticut Light and Power Company that the electric energy which it sold to the Borough of Groton was delivered to Fishers Island?

Mr. Branch: May it please the Examiner, I don't think that is an issue. I stated that the first time that that question came up, that we did know of it, and made no contention that we didn't. I don't see the point of examining witnesses on that.

* * * * * * [*2018*]

Mr. Branch: By "the electric energy", do you mean some of it or what?

Mr. Wahrenbrock: I will reframe the question in accordance with that suggestion.

By Mr. Wahrenbrock: *Q* That some of the electric energy which The Connecticut Light and Power Company delivered to the Borough of Groton was delivered to Fishers Island at 6600 volts? *A* Yes.

Q I wish now to call your attention again to that map which is attached to the 1937 power system statement to which I referred a moment ago, and which is before you there, and [*2019*] call your attention to the facilities at Bristol, as shown on that map and ask you if they are properly indicated on the map, and by the legend to the map.

Mr. Branch: I think it should appear for what purpose they are indicated. A great point has been made by the Commission that the purpose makes all the difference, and it doesn't seem to me that what appears on this map necessarily has any bearing on the issues here.

Trial Examiner: I think the witness may explain the purpose at the same time. I believe that would take care of the matter.

* * * * * *

The Witness: The facilities at Bristol here are indicated as a substation, and in the legend Bristol is indicated as a transmission substation. That is due, I think, to this fact, because I noticed all substations on this map, or the few that I happened to notice—I didn't remember the map in particular—that are connected either to 66,000 volts or [*2020*] to 33,000 volts, are accounted for here as being transmission. That has been used in some departments —the map making department in the company, I know, has so considered those things at times, whereas others in the company would consider that Bristol was not a transmission substation, that it merely hooks up with the voltage of the line that supplies it. It does not definitely, to my mind, classify as to whether the substation would be a transmission substation or a distribution station. I notice several substations here in the tabulation that are in the

tabulation as transmission substations. That, outside of the fact that they have 66,000 volts, is the only meaning that they have, that they are connected to a source of 66,000 volts, because obviously some of them are in error.

[*2021*] *Q* Would you say that that map which was submitted with that power system statement was in error with respect to the designation of the Bristol substation? *A* I would.

Q You say it is in error? *A* Yes.

Q As of the time it was made and submitted? *A* I think so.

* * * * * *

Mr. Wahrenbrock: I hand the reporter for identification as Exhibit 67, a photostat of a copy of a letter signed by C. T. Hughes, addressed to Mr. W. C. Allen, Division Plant Superintendent, Western Union Telegraph Company, 60 Hudson Street, New York City, under date of May 16th, 1939, this being a photostatic copy of the letter furnished me by respondent's counsel pursuant to my request after examination of the data they have made available to me, pursuant to the requirements of the subpoena.

May the copy I have handed the reporter be marked for [*2022*] identification?

Trial Examiner: It will be marked by the reporter as Exhibit No. 67 for Identification.

(Document referred to was marked Exhibit Number 67 for Identification.)

By Mr. Wahrenbrock. *Q* I show you Exhibit 67 for Identification and ask whether you signed the original of which this is a copy? *A* I believe I did. I recognize it, anyway.

Q Do you recall that on the same day you wrote two other letters, substantially identical with this letter, one to the Telephone Company, I believe it is New England Telephone Company, and one to the New Haven Railroad? *A* That is quite likely. These things go to a great many each time, and it is quite logical that I should

Mr. Wahrenbrock: I might say that I have seen such letters. I don't care to clutter up the record with more than one of them, as long as one illustrates my point.

By Mr. Wahrenbrock: *Q* I direct your attention to the first paragraph of that letter, which reads:

> "The Connecticut Light and Power Company is constructing a 22,000 volt transmission line from its existing substation at Columbia, to its existing substation at Colchester. Your facilities will be crossed at one point as shown on the photo- [*2023*] static copy of the map attached."

I ask you whether it was common among the officials of the company to refer to the line there referred to as a transmission line.

Mr. Branch: I object unless the purpose to which they referred is shown.

Mr. Wahrenbrock: I will ask it this way:

By Mr. Wahrenbrock: *Q* —Whether it was common among the officials of the Company to refer to this line for any purpose or for all purposes as "transmission lines"?

Mr. Branch: Same objection.

Trial Examiner: I think under the circumstances, if it is not for all purposes, the witness can show what the purposes are. The objection is overruled.

A In this question of lines, as to whether they are transmission or distribution or supply lines, there is not a clear-cut line of demarcation as to what is what.

Mr. Wahrenbrock: Mr. Examiner, I wish to ask that that part of the answer which has been given be stricken and that the witness be requested to answer the question directly.

Mr. Branch: I think he may be allowed to proceed until he has finished, and let us see whether he has answered it.

Trial Examiner: I think the witness's method of answering the question may be permitted. The motion to strike is over- [*2024*] ruled.

Mr. Branch: May he not be permitted to go on with his answer?

Trial Examiner: You may proceed with your answer. Will the reporter read back the statement that has been already made?

(Statement read.)

A As to which is transmission and which distribution and which supply lines, as the terminology is ordinarily used in our company, in the general organization, I know occasions that we think of and so treat 22,000 volt lines as being transmission, that is, when you speak of it, use it in a certain sense. But, if I was considering it from a different point of view, I would call it a supply line, if I would give the matter any thought.

In dealing with the communication people, anything carrying on negotiations with the Telephone or the Telegraph or outside companies, most joint-line practice only goes up to 5,000 volts and the Telephone Company are inclined to call anything above 5,000 volts, transmission, not that it is in the sense of a transmission line, but that is just common terminology between them, among them, in our usual discussions, there being no clear-cut distinction as to whether it is. If I were discussing this with our people I would be inclined to call it a supply line, neither a distribution nor a transmission, I would say it was a supply line. That is our ordinary day-to-day use of the [*2025*] term.

By Mr. Wahrenbrock: *Q* Does that complete your answer? *A* Yes.

[*2026*] *Q* What was the purpose for which that line referred to in Exhibit 67 for Identification was being constructed? *A* It was being constructed to supply the loads in East Hampton, Leesville, and that general territory.

Q How had those loads previously been supplied? *A* Power had been purchased from The Connecticut Power Company in Portland.

Q And a line owned by the company had run from Pole 110 of The Connecticut Power Company in Portland to the facilities of

The Connecticut Light and Power Company in East Hampton? *A* Yes.

Q That line from Pole 110 to The Connecticut Light and Power Company's facilities in East Hampton was abandoned or removed, was it, subsequent to July 1, 1939? *A* Yes.

Q And this line referred to in Exhibit 67 for Identification was to serve the purpose which had formerly been served by that line from Pole 110 to East Hampton? *A* That purpose plus a little additional more.

Q What was that? *A* We increased the voltage on the lines from 13,800 to 22,000, with new construction. That decreased the drops and losses, and so forth, and it eliminated the purchase of power which we found it was more economical to supply from our own facilities.

[*2027*] *Q* Now, aside from such increase in lines and transformer losses as might have been due to the use of the higher voltage, there wasn't any sudden increase in the loads of East Hampton, Leesville and Colchester districts overnight, prior to July 1st, was there? *A* I will have to make that a little clearer, just why that was done. It isn't a yes or no answer. I can tell you the story of why it was.

Q I wish you would answer the question to the point as much as you can, but explain it as necessary. *A* Several years previous to this time, it was realized that as the load in this territory grew, it would likely be more economical to supply it from the company's lines. In the hurricane of 1938, in the Fall of 1938, the small Leesville hydro electric plant was incapacitated. It was washed—part of it was washed away. This naturally required such power as the Leesville hydro plant was furnishing to the territory be added to the purchase requirements, and it became evident at that time that it would be profitable for us to supply the load from our own generating facilities, and plans were gotten under way to do it. If I remember correctly, we had hoped to have the construction completed by January 1, 1939, but it was

delayed about six months because of troubles in the hurricane, and our construction crews were busy, and we just didn't get it done.

[*2028*] Mr. Wahrenbrock: Mr. Examiner, at this time I offer Exhibit No. 67 for Identification in evidence.

Mr. Branch: I object on the ground that it is immaterial.

Trial Examiner: The objection is overruled. Exhibit 67 is admitted in evidence. Exception will be noted for the respondent.

(Exhibit 67 for Identification received in evidence as Exhibit 67.)

By Mr. Wahrenbrock: *Q* Mr. Hughes, I now show you Exhibit 43, and call your attention to the paragraph at the bottom of the second page of that exhibit, the paragraph which is numbered IV, and which reads:

"The buyer", and by that the reference is to the Central Connecticut Power and Light Company, and I ask you if the Central Connecticut Power and Light Company was a predecessor of the Connecticut Light and Power Company? *A* I believe that is so.

Q I now continue reading:

"The buyer agrees to install a rotary condenser or other equivalent apparatus of suitable size to control its power factor, and further agrees to maintain during the term of this contract, or accept adjustment of demands thereto, the following power factor on its system at all hours requested by the [*2029*] seller: 60 per cent for demands" *A* I don't follow you.

Trial Examiner: That is Roman numeral IV. It starts at the bottom of the second page.

By Mr. Wahrenbrock: *Q* Do you find the place now, Mr. Hughes? *A* Yes.

Q I continue reading: "80 per cent for demands less than 500 kilowatts; 90 per cent for demands of 500/2000 k.w.; and 95 per cent for demands over 2,000 k.w." That is the end of the quotation, and I ask you, Mr. Hughes, whether the rotary condenser, or other equivalent apparatus, was maintained, if it was main-

tained, pursuant to the requirements of this term of the contract? *A* I believe there was a condenser, a static condenser installed at the East Hampton substation. Just when it was installed, I don't know, and I am not sure about the capacity. But there was a static condenser there, I am sure.

Q Up to what date, approximately?

* * * * * *

A It was up to the time the old East Hampton substation was dismantled, which was shortly after July 30, 1939. That substation was dismantled, and the condenser was taken [*2030*] out. But there was another contract that superseded this arrangement in 1936.

* * * * * *

Q Was that static condenser a rotary condenser? *A* No.

Q A synchronous condenser? *A* No.

Trial Examiner: Will you answer? I don't think the reporter can take a shake of the head.

The Witness: I said no.

By Mr. Wahrenbrock: *Q* Did that condenser in general serve the same purpose which a synchronous condenser would have served? *A* In broad terms, yes. There is some—technically there is some difference, but in broad terms, yes.

* * * * * * [*2031*]

Mr. Wahrenbrock: I hand respondent's counsel, the Examiner and the reporter, for identification as Exhibit No. 68, photostatic copies of the map which is part of the Power System Statement for 1937, to which the previous questions and answers referred, and ask that it be identified and admitted in evidence.

Mr. Branch: I object to its admission on the ground that it is immaterial in purpose, characterization not appearing, the witness having stated that these terms were loosely used.

Trial Examiner: Does counsel contend that this may not be deemed admissible for any purpose?

Mr. Branch: I didn't understand you.

Trial Examiner: I say, does counsel contend that nothing contained in this map be deemed material?

Mr. Branch: Well, if it is designed to show the facilities of the Company, I would say that it does not appear to show the connections with the C. P. lines or anything of that kind, and I don't understand that it is offered for any purpose, except a certain character. I have no doubt that it is an accurate map of the State of Connecticut, and in a good many other ways it may be all right, but that isn't what it is offered for.

Trial Examiner: Does counsel have any question as to the [*2032*] accuracy of the name-plate rating statements shown on the various stations?

Mr. Branch: As to what, sir?

Trial Examiner: Name-plate ratings as shown in regard to various stations.

Mr. Branch: I am not quite sure that I understand what you mean by "name-plate ratings", sir.

Trial Examiner: Well, now, for instance, Leesville is marked here with the figures 390 under it, and the legend down on the lower right-hand corner shows—

Mr. Branch: I just don't know, sir, because I have never examined it, but I didn't understand that was the purpose of offering it. There is a great deal of detail on that map.

Trial Examiner: I don't know that there was any general purpose expressed. I think a couple of questions were asked but counsel didn't state that the purpose was limited to the answers to those questions.

Mr. Branch: Well, I should think the purpose ought to be stated, and the parts of it which are to be considered. Just presenting a map without a statement of the purpose, it seems to me would be a matter that would call for a question as to the purpose for which it is offered.

Trial Examiner: Will Commission counsel state the purpose?

Mr. Wahrenbrock: The purpose of identification?

Trial Examiner: No, the purpose of offering it in evidence. [2033] As I understand, it is offered both for identification and in evidence.

Mr. Wahrenbrock: And the purpose of my offering it in evidence is to show the existence of the several facilities shown thereon owned by The Connecticut Light and Power Company, to show its ownership of those facilities, and particularly facilities which have been the subject of testimony in this proceeding, upon which we assert Commission jurisdiction at the time covered by the map, may be said to rest in part. Also for the evidence it throws upon the mode of characterization of the facilities in question by the Company, in its report to the Federal Power Commission.

Mr. Branch: I think in view of the testimony of this witness, the characterizations are not proper to be put in evidence, and I object to those going in.

Trial Examiner: I think that may affect the degree only, in that matter, Mr. Branch: The objection of the respondent is overruled and the exhibit will be admitted in evidence as Exhibit Number 68. You will note an exception for the respondent.

(Exhibit 68 for Identification was marked Exhibit 68 in Evidence.)

Mr. Wahrenbrock: I hand respondent's counsel, the Examiner and the reporter, for identification as the next exhibit, photostatic copies of the map which is part of the corresponding Power System Statement for the year 1938, and offer it in evidence.

[2034] Trial Examiner: Has counsel any objection?

Mr. Branch: Same objection, sir.

Trial Examiner: The objection will be overruled. The photostat will be admitted in evidence as Exhibit Number 69. Note an exception for the respondent.

(Exhibit Number 69 for Identification was received in evidence.)

Mr. Wahrenbrock: I hand respondent's counsel, the Examiner and the reporter, for identification as the next exhibit, photostatic copies of the corresponding map submitted in the corresponding Power System Statement for the year 1939, and ask that it be marked in evidence.

Mr. Branch: Same objection.

Trial Examiner: The objection will be overruled and the photostat will be admitted as Exhibit Number 70. Note an exception for the respondent.

(Exhibit Number 70 for Identification was marked Exhibit Number 70 in Evidence.)

[*2035*] Mr. Wahrenbrock: I hand respondent's counsel, the Examiner, and the reporter, photostatic copies of map and legend pertaining thereto, from the Electric Power Survey report of the respondent for 1927 to 1933, for identification as the next exhibit, and ask that it be received in evidence.

Mr. Branch: What is the date of this? What is the date when this was filed?

Trial Examiner: Will you state the date of the filing, Mr. Wahrenbrock?

Mr. Wahrenbrock: I can in a moment. It will have to be checked for me.

Mr. Branch: Will you also give me the primary instructions which appeared in this, which were evidently followed in making this out—the general instructions.

Mr. Wahrenbrock: I shall be glad to have those incorporated by reference from the form of the respondent.

Mr. Branch: Well, I should like to see this before taking my position in respect to this.

Mr. Wahrenbrock: I will be glad to show it to you.

Trial Examiner: Will counsel submit the copy of those instructions to respondent's counsel?

Mr. Wahrenbrock: Yes, sir. I hand respondent's counsel the document, report of Electric Power Survey of The Connecticut

Light and Power Company (main system), central territory only, to the Federal Power Commission, and direct his attention [*2036*] to the instructions which appear on the second page thereof, inside the cover.

May the record show that respondent's counsel have returned the report to Commission's counsel.

Mr. Examiner, at this time, in accordance with an understanding with respondent's counsel, I would like to suspend with the examination of Mr. Hughes, temporarily, with the right to recall him later, and call Mr. Colvin.

Trial Examiner: Before doing that, I would like to ask one question in regard to Exhibits 59 and 70. I understood that the objection did not include any question as to the fact that they actually were maps attached to such reports.

Mr. Branch: Oh, if Mr. Wahrenbrock assures me that is so, I am satisfied with his statement.

Mr. Wahrenbrock: They have been prepared from the original maps in the possession of the Federal Power Commission.

Trial Examiner: It is so understood.

Mr. Wahrenbrock: I would like to have a ruling on these that I have offered.

Mr. Branch: I didn't realize that anything had been offered that hadn't been ruled on.

Trial Examiner: Exhibit 71 hasn't been formally offered yet, I don't think.

Mr. Wahrenbrock: I do so offer it.

[*2037*] Mr. Branch: I object on the ground it appears that this was filed in January, 1935, and also that the designation was not the designation that the company itself necessarily adopted.

Trial Examiner: It will be marked for identification. The question of admission will be reserved.

(The document referred to was marked as Exhibit No. 71 for Identification.)

* * * * * *

ALLAN D. COLVIN,
previously sworn, resumed his testimony.

Direct Examination (resumed) by Mr. WAHRENBROCK.

Q Mr. Colvin, will you state your full name for the record, please? *A* Allan D. Colvin.

Q What is your home and your business address? *A* My home address is 8 Nathan Hale Street, New London, Connecticut; business address, 31 Union Street, New London, Connecticut.

Q Will you please state what positions you have held [*2038*] with the Connecticut Power Company, and what the duties of those positions were? *A* I have held one position with The Connecticut Power Company, that of executive vice-president. The duties are of a general supervisory nature, covering at the present time the operations of the six divisions of The Connecticut Power Company.

Q On what days of the month is The Torrington Electric Light Company billed for the electric energy which The Connecticut Power Company sells and delivers to it? *A* My understanding is that the billing covers the calendar month. I do not know on what particular day the bills are forwarded. It is the first few days of the month.

Q Have you any personal familiarity with that billing? Do you see those bills? *A* I see the bills after they have been made out.

Q Are you familiar with the method of billing which is followed? *A* I think I have a memorandum covering the basis of the billing, if that is to what you refer.

Q Yes. *A* The Connecticut Power Company's monthly bill to The Torrington Electric Light Company is based on the following:

A demand charge of $1.75 per kilowatt of maximum yearly demand, less an allowance of 2,500 kilowatts for steam station [*2039*] capacity held in reserve by The Torrington Electric Light Company, an energy charge of 9 mills per kilowatt-hour for the first 160 hours use of the demand and 5 mills per kilowatt-hour for the excess.

A statement of this relationship was filed with the Federal Power Commission by letter from Mr. Barney, General Counsel of The Connecticut Power Company, dated November 8th, 1937. The effective date of this certificate was January 1, 1936.

During the year 1941 there is a credit adjustment of a little over $8,000 being made in nine monthly installments by The Connecticut Power Company.

Q Referring to this 2,500 kilowatt allowance for the steam capacity at Torrington, has there been any change in that allowance recently? *A* No, sir.

* * * * * * [2040]

Q Is the allowance of 2,500 kilowatts based upon the [2041] assumption that The Connecticut Power Company has the first claim on the steam facilities of The Torrington Electric Light Company at Torrington?

Mr. Branch: I object. In the first place, it doesn't seem to me that the matter is relevant at all and in the second place it seems to me it is a matter of contract. The contract should appear.

Trial Examiner: If there is any question of ambiguity in the contract, I think the reasons behind the contract should be explained. The witness will be permitted to answer, and an exception will be noted for the respondent.

A The contract under which Torrington was originally served, was made almost thirty years ago and has been modified by agreement from time to time. The original contract, as I recall it, only called for the delivery of surplus hydro-energy to Torrington. I heard Mr. Barney testify last week that he did not regard the contract as legally binding, I think, upon either party. The reason for maintaining steam capacity at Torrington is mainly if an interruption should occur on the line, supplying Torrington, that a small amount of energy might be available to carry what might be termed the essential loads, such as the hospital, possible street lighting, and things of that sort.

I am not informed in detail about the Torrington plant, but my opinion is that it has an installed capacity in excess [*2042*] of 5,000 kilowatts.

By Mr. Wahrenbrock: *Q* Have you brought with you the original contract of 1912 between The Connecticut Power Company and the Torrington Electric Light Company, together with amendments thereto? *A* I have not.

Q Have you informed yourself as to the dates of amendments thereto? *A* I have not.

Q I show you Exhibit 31 and ask you if that is the statement with respect to the contract between The Connecticut Power Company and The Torrington Electric Light Company to which you referred in your previous testimony as being filed with the Federal Power Commission by Mr. Barney. *A* That, with Mr. Barney's letter of transmission, I believe, is a statement as of November 8th, 1937.

Q And you do not have the actual contract as amended and modified? *A* I have not the copy of it. Some of the modifications may be in writing. I believe that some of them are verbal. That was the reason this certificate was filed with the Federal Power Commission as outlining the existing agreements with Torrington. I understand that a new contract with The Torrington Electric Light Company is under negotiation.

Q At the present time? *A* At the present time.

[*2043*] *Q* Has it come to the attention of The Connecticut Power Company that the steam capacity of The Torrington Electric Light Company is being utilized to serve The Connecticut Light and Power Company from Torrington? *A* The Connecticut Power Company has had no official notice as such. Certain of its officers have knowledge that the steam plant in Torrington is being run. I personally do not understand that the running of that steam plant is limited to the supply of Winsted.

Q Well, will you explain what you mean by that. *A* I understand that certain Torrington street lights are run from that unit.

Q Would the fact of that operation affect the basis upon which The Torrington Electric Light Company is billed by The Connecticut Power Company under the terms of the contract between them, as modified? *A* It has not affected the billing.

Q Are you familiar with the arrangement of the electric light facilities of The Connecticut Power Company at Torrington? *A* In general.

Q Are you familiar with the changes which have been made in those facilities since the beginning of this year? *A* I am familiar with the changes that were made and completed early in March of this year.

[*2044*] *Q* I show you Exhibit 38, and ask you if by referring to that exhibit you can explain the chronological order of the changes which have been made in the facilities by which Torrington is served from CP1 and CP2 from the date as of which this large sheet, which is designated at 4031-F was prepared, down to the present, beginning with the situation as it was as of January 10, 1940, that being the date on this large sheet. *A* Drawing 4031-F, with correction through No. 4, was as of December 31, 1940, and was filed with form 64 of The Connecticut Power Company, and has attached to it a number of stickers, which showed changes that were contemplated in the year 1941, of which the sticker attached to Exhibit 38 is a part. The change that was made at Torrington was the installation of a 15,000—

Q The change made when, please? *A* In the job ending during March, 1931—or '41, excuse me, was the addition of a 15,000 k.v.a. three-phase transformer, connected between the 66,000 volt lines of The Connecticut Power Company and the 2300 volt lines—or buses—that is a correction—of The Torrington Electric Light Company, and that included a modification of the switching on the 66,000 volt side of the Torrington supply, and is located a few hundred feet toward switching tower 276, from the main substation of The Torrington Electric Light Company, which is occupied in part by The Connecticut Power Company.

[2045] *Q* Has there been a change in the ownership of the 2300 volt bus, as between The Connecticut Power Company and any other company? *A* There has not.

Q On the sheet which is marked 4031-F of Exhibit 38, is the 2300 volt bus shown in solid line? *A* It is.

Q And what does that indicate as to ownership? *A* According to the legend, it indicates ownership by the Connecticut Power Company; at the time of your visit in May, 1941, that was drawn to our attention by either you or one of your associates, and we stated that this drawing was prepared for the use of various officers and employees of the Commission and for—

Q You mean of the company? *A* Of the company, and for submission to various regulatory commissions, and we agreed that it was not correct in all its details. And on the sticker which has been attached to this same drawing, the ownership of the 2300 volt bus is indicated as owned by others, the others meaning The Torrington Electric Light Company.

Q Now, have there been any subsequent changes to your knowledge of the wiring of The Connecticut Power Company or the facilities of The Connecticut Power Company at Torrington?

Mr. Branch: I didn't get that question. May I have it [2046] read, please?

Trial Examiner: Read the question back for the benefit of respondent's counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: The job was substantially completed early in March, 1941. There remained tag ends of work to do in putting in small wiring, and things on which temporary connections had been made. That continued for a month or two after that, but there had been no essential changes in the installation of apparatus in Torrington since March, 1941, belonging to The Connecticut Power Company.

* * * * * * [2047]

Q Has there been any change in the facilities by which the

facilities of The Connecticut Power Company are connected to the facilities of The Torrington Electric Light Company since this change which you have just described as having been made in March of this year? *A* If I understand the question correctly, the two banks of 7,500 k. v. a. transformers are not normally operated in parallel with the 15,000 k.v.a. bank or the 15,000 three-phase transformer. Either the 15,000 k.v.a. transformer or rather the two 7,500 k. v. a. banks are sufficient for Torrington's requirements, and both sets are not normally in operation at the same time, and both sets have alternated since early in March, 1941.

Q And how is that accomplished, by switches? *A* By switches.

Q Does that require any difference in the wiring connections? *A* No, sir.

[*2048*] *Q* Then, have the facilities by which The Connecticut Power Company's facilities are interconnected with those of The Torrington Electric Light Company remained the same since the completion of those changes in March to which you referred? *A* We have supplied The Torrington Electric Light Company with energy since March, 1941, over the facilities indicated on the tab attached to Exhibit 38.

Q Well, what is there about my question that you can't answer directly, Mr. Colvin? *A* I frankly thought it was a trick question, and I didn't know what the trick was.

Q Well, I am sure I don't either. I would like to have a direct answer. *A* We have used exactly the same facilities over the same bus bars to supply Torrington since March, 1941 to date.

Q Has The Connecticut Power Company received delivery of electric energy to it from any other company at Torrington, in the last few months?

* * * * * * [*2049*]

The Witness: Other than an accidental interchange, I know of no delivery of current to The Connecticut Power Company at Torrington since 1929.

* * * * * *

Q I read the second paragraph of the letter to which I have referred, being a letter dated December 1, 1932, to The Torrington Electric Light Company, Torrington, Connecticut, attention of Mr. C. E. Smith, treasurer, and signed by A. C. Bristol, manager, as it appears on page 170 of the transcript, as follows:

> [*2050*] "Beginning with November 1, all surplus power supplied to your company will be billed at 5 mills. A meter will be installed at the earliest convenience which will measure any power which we might furnish over and above the Torrington load, and which would find its way into the lines of The Connecticut Power Company."

And I ask you if that meter was installed, for measuring any power which The Connecticut Light and Power Company might furnish The Torrington Electric Light Company, which would find its way into the lines of The Connecticut Power Company. *A* I have no knowledge of such a meter, and no knowledge of such a letter.

Q Since August 26th, 1935, has The Connecticut Power Company, in billing The Torrington Electric Light Company, ever allowed a credit for electric energy which The Connecticut Power Company received from The Torrington Electric Light Company? *A* Not to my knowledge.

Q Well, do you know? *A* The bills have passed over my desk each month. I think as unusual a thing as that would have caught my attention. There is no arrangement whereby The Connecticut Power Company agrees to take any energy from The Torrington Electric Light Company, except in case of an emergency, which would require the [*2051*] use of the steam generating plant.

Q Is there any arrangement whereby The Connecticut Power Company would have the use of the steam capacity of The Torrington Electric Light Company in an emergency? *A* The latest emergency that occurred was a sleet storm early in March, 1940 and The Torrington Electric Light Company were asked to start

and did start the plant. Fortunately, it was possible to repair the transmission lines, so that little use was made of the Torrington steam plant.

[*2052*] *Q* Was some use made? *A* Yes, sir.

Q Energy received by The Connecticut Power Company? *A* No, sir.

Q Then what use was made? *A* Torrington presumably used it to supply its customers.

Q And is that pursuant to the arrangement which results in the allowance of a 2500 kilowatt in your billing practice that you described? *A* The allowance of the 2500 kilowatt as I described as to make it available in case of accident or emergency to carry what might be termed essential loads in Torrington, or some part of them, over the emergency.

Q Referring to Exhibit 38, will you describe the facilities of The Connecticut Power Company for the delivery of electric energy to The Connecticut Light and Power Company at Bristol? *A* The 66,000 volt transmission line from the South Meadow substation to Falls Village is tapped at Tower 474, which is located on what is known as Bristol mountain. From that point a tap line 1.83 miles long runs into the City of Bristol and terminates at the plant of The Connecticut Light and Power Company, which is in about the center of Bristol. At Tower 474 certain switching equipment is installed and maintained by The Connecticut Power Company. It consists of [*2053*] two oil switches, one automatic and one non-automatic, and some disconnecting switches. I believe there is a battery at that location to provide the energy to operate the electrically operated oil switches. The tap line from Tower 474 to the plant of The Connecticut Light and Power Company is a steel tower line, and it carries two circuits, each composed of three No. 2 solid copper conductors, as well as a ground wire, which is not electrically connected to those circuits.

Q Where does The Connecticut Power Company's ownership of those two circuits which run from Tower 474 to Bristol substation of The Connecticut Light and Power Company end?

* * * * * *

The Witness: The Connecticut Power Company's ownership terminates with the conductors attached to the steel structure located in the enclosure of The Connecticut Light and Power Company, although I am told that our operating forces test the insulators that are attached to that structure.

Q Do I understand, then, that The Connecticut Power [*2054*] Company's ownership extends to what I might refer to as the hot end of the insulators which are attached to the steel structure of the substation? *A* It ends with the point where the conductors are attached to the insulators.

Q Does the ownership of The Connecticut Power Company include the leads from the conductors which drop down into the substation? *A* I have just testified that it terminates where they were attached to the insulators.

Q Yes, but what I want to clarify is that there are leads which are wrapped around or attached to those conductors which drop down below the insulators, and I want to clarify the question with respect to the ownership of the leads, where it terminates. *A* We own nothing except the lines that are attached to the strain insulators that go at right angles there—to the steel structure in the Bristol enclosure.

Q Well now, may I have this clear, then. Attached to the conductors which come up to those insulators, about two or three or four feet from the conductors, is a loop or lead which hangs down below and goes to the substations. Those are not owned by The Connecticut Power Company? *A* Those are not the property of The Connecticut Power Company.

[*2055*] *Q* Thank you. Now, how are those switches at Tower 474—one of them you referred to as a non-automatic oil switch, and one as an automatic oil circuit breaker. How is the automatic oil circuit breaker operated? *A* The automatic oil circuit breaker is normally operated by current transformers working through relays, to the mechanism that controls the circuit breakers.

Q Can they be controlled by manual operation? Can that switch be controlled by manual operation? *A* They can.

Q Where is the control to that switch located? *A* There is control for that switch located at Tower 474. There is also control for that oil switch located on the property of The Connecticut Light and Power Company, whose operators act as our agents, and can open or close those switches, and have instructions to do so when certain emergency conditions arise.

Q Are you referring now to the automatic and the non-automatic oil switches, or oil circuit breakers at Tower 474? *A* Yes, sir. May I clear up the automatic and non-automatic?

Q Yes, please. *A* The one that is non-automatic was formerly automatic. Its rating is sufficiently low so that we fear a certain short circuit condition developing, the switch might [*2056*], destroy itself. So rather than have it operated automatically, we are using it as a disconnecting oil switch, and not subject to automatic operation. The one I have described as an automatic oil switch is of a more recent design and is capable of handling any amount of energy that is liable to be concentrated at that point in case of trouble.

Q Now, one of those switches is located on the CP1 and one on the CP2 line? *A* Yes, sir.

Q And what is the purpose of those switches? *A* Referring to the automatic and the non-automatic?

Q The two oil switches? *A* The two oil switches—the purpose is to separate the line from Tower 474 to South Meadow substation, and from Tower 474 to the Falls Village station.

Q The lines CP1 and CP2 to the west of Tower 474 can be separated from those lines to the east of the Tower 474 by those oil switches? *A* Yes, sir.

Q And controls, electrically operated controls of those switches are located in the substation at The Connecticut Light and Power Company at Bristol, are they? *A* There is one point from which they may be controlled, located on the property of The Connecti-

cut Light & Power Company in Bristol. That property, the means of controlling [*2057*] those switches and the cable over which it operated, is the property of The Connecticut Power Company.

Q Are those controls located on the switchboard of The Connecticut Light and Power Company? *A* My understanding is that The Connecticut Power Company owns at least one panel in that switchboard.

Q Is that arrangement covered by written contract between the companies? *A* The contract is already in evidence, and it is not. The operators—

Q I don't understand you. *A* The contract for the supply at Bristol has already been introduced in evidence, and it is not contained in that contract. There are written instructions to the operators of The Connecticut Light and Power Company allowing them to act as agents of The Connecticut Power Company in the operation of the plant from The Connecticut Light and Power Company at Bristol the switches which are the property of The Connecticut Power Company at Tower 474.

Q Have you copies of those written instructions? *A* I haven't a copy with me. The main instruction is that if there is an interruption at Bristol, the operator shall energize Bristol from either CP1 or CP2, whichever one he may find alive. The other operations of the switch at Bristol would be normally in the case of a line we desired for main- [*2058*] tenance work, that the switch might be opened, properly tagged, in accordance with the safety rules of the State, and the routine operations. The simple instruction that I have given you, that in case of any interruption, the operator shall make Bristol alive from either CP1 or CP2, which ever he may find available. And I call your attention that, in the connection to the CP1 and CP2, that the leads to Bristol are—from CP1—are on the Hartford side of the oil non-automatic breaker, and on CP No. 2, on the Falls Village side of the automatic breaker.

Q Who issues those instructions? *A* The instructions were

agreed upon between Mr. Whiting, the manager of our Housatonic division, and the load dispatcher in Hartford, in conjunction with the superintendent of power in Hartford, and were signed by both of those men.

Q Now, when you refer to the load dispatcher in Hartford, the load dispatcher of what company? *A* By designation during normal operation, the load dispatcher of The Hartford Electric Light Company is designated as load dispatcher of The Connecticut Power Company, and acts as an agent of The Connecticut Power Company. This is because of communication facilities. Formerly, the operators at Falls Village were designated as the load dispatchers of The Connecticut Power Company, but were unable in times of trouble to get communications with certain points. It was therefore found [*2059*] by having the dispatchers located at the South Meadow station, designated as load dispatchers for The Connecticut Power Company, that the period of interruptions might be shortened.

[*2060*] *Q* Now, I think you referred also to a superintendent. Of what Company were you referring to? *A* I referred to Mr. Douglas, the Superintendent of Power of The Hartford Electric Light Company.

* * * * * *

Q Then do I understand that the instructions to The Connecticut Light and Power Company's operator at Bristol are instructions which are signed by officers or employees of The Connecticut Power Company? *A* By an officer of The Connecticut Power Company.

Q Who? *A* Mr. Whiting.

Q Signed by Mr. Whiting? *A* Yes, sir.

Q Now, is there any instruction by The Connecticut Light and Power Company to its operator at Bristol to observe those instructions? *A* I do not know.

* * * * * * [*2061*]

Q Can you cite me any other instance in which an employee of

The Connecticut Light and Power Company acts under an instruction from The Connecticut Power Company? *A* Well, I can cite that the operators on duty for The Torrington Electric Light Company act as our agents, with similar instructions. The practical side is that our high-voltage men are located in Thomaston. If it is desired for any reason to delay resumption of services, it is possible for one of our men to go from Thomaston to Bristol or from Thomaston to Torrington. If it is desired to keep interruptions at a minimum, it is wise that the man who may be on duty be authorized to energize his community from either line which is alive.

Q Now, may my question be read and answered?

Trial Examiner: Read the question and answer back for the benefit of Commission counsel.

Mr. Wahrenbrock: I just want the question read and answered then, please.

Trial Examiner: All right, then. You will read the question.

[*2062*] (The question is read by the reporter.)

A Similar operating arrangements are in existence between Stamford Division of The Connecticut Power Company and the adjoining divisions of The Connecticut Light and Power Company, on the interchange agreement at that point.

Trial Examiner: Do I understand you to say The Connecticut Light and Power Company, as to both cases? Did I get that answer right?

The Witness: Between The Connecticut Power Company at Stamford and the adjacent divisions of The Connecticut Light and Power Company, which would be, I think, designated as their Greenwich Division and the transmission line that passes through Stamford and terminates, I think, at Norwalk.

By Mr. Wahrenbrock: *Q* Is there any such arrangement with respect to any other point on the C.P. 1 or C.P. 2 lines? *A* I have just testified that there was a similar arrangement as to Torrington. The Connecticut Light and Power Company have no operator at Torrington.

Q I mean, is there any other such arrangement as to The Connecticut Light and Power Company on C. P. 1 and C. P. 2 lines? *A* There is no other place you could have one.

Q Is there anything in writing with respect to any arrangement between the two companies for the operator at Bristol to follow the instructions assigned by Mr. Whiting? [*2063*] *A* I have already testified that I am not familiar with what orders The Connecticut Light and Power Company may have given to their operators at Bristol.

Q Does The Connecticut Power Company depend upon the Bristol operator to obey the instructions issued over Mr. Whiting's signature, as to that operator, without knowing whether that operator has been instructed by The Connecticut Light and Power Company to observe those instructions?

* * * * * *

A I can only say that the Bristol operator does act in the manner that I have described.

By Mr. Wahrenbrock: *Q* You have no knowledge of whether The Connecticut Light and Power Company has done anything, issued any instructions, to see to it that those instructions are complied with? *A* I feel sure that the man assigned as an operator at Bristol would carry out no routine instructions from an officer of The Connecticut Power Company without the approval of his superiors.

Q Mr. Colvin, are you willing to produce either the original, in order that I may make a copy, or a true copy of those instructions, over Mr. Whiting's signature? [*2064*] *A* I will endeavor to do so.

* * * * * *

Q Can you tell me, Mr. Colvin, when those instructions were issued? *A* I cannot give you the date of the last memorandum. There have been several, but the last memorandum I believe is of certainly several years' standing.

Q I wish now to refer again to Exhibit No. 38, and directing

your attention to the left-hand upper corner of that exhibit I would like to ask you to identify at the Falls Village Generating Station, generators Nos. 1, 2 and 3, respectively, on the exhibit. *A* I am unable to identify them as Nos. 1, 2 and 3. The three generators at Falls Village, I believe, are identical. They are shown on drawing 4031-F as of 3,000 kilowatt capacity. I believe they are of Allis-Chalmers make and are installed in approximately 1913 and are driven by suitable waterwheels.

Q You say you are unable to say which is No. 1 and which No. 2 and which No. 3? *A* I frankly don't know whether the one nearest the door [*2065*] is Number 1 or the one on the upstream side of the station. I do not recall the order in which they are numbered. They are identical.

Q Can you identify at the Falls Village substation which is transformer No. 1 and which is transformer No. 2? *A* No, sir. There are three transformers in each bank.

Q Well, which is transformer bank No. 1 and which is transformer bank No. 2? *A* As far as I know the two transformer banks are identical. I do not know which one bears the designation No. 1 and which the designation No. 2. This is a diagram to which we are referring, and it is not necessary that things that are to the north be to the north and things that are to the south be to the south.

Q What is the efficiency of those transformer banks at full load? *A* The categorical answer is, I do not know. Those transformers were purchased by Stone and Webster in 1913. As far as the records of The Connecticut Power Company show, there is no manufacturer's test for those transformers on file. The specifications on which the Allis-Chalmers Company proposed to furnish those transformers to Stone and Webster, about 1913, specified transformers that would have an efficiency of 98.2 per cent at half load, at full load 98.5 per cent, an iron loss in watts of 18,000 and a copper loss in watts of 19,000.

[*2066*] *Q* That is for each bank, is it? *A* It is for each transformer. There are six single-phase transformers.

Q What you have just stated is true for each of those single-phase transformers? *A* The proposal of the manufacturer was to furnish six transformers that would have a characteristic which I have given.

Q At the Falls Village substation, will you please identify on the diagram what is referred to as the North tie-cable and the South tie-cable? *A* I see no such designation on the diagram.

Q I didn't mean to imply that they were on the diagram. I would like to have you point out on the diagram where those tie-cables are.

* * * * * * [*2068*]

Q I show you Exhibit 25, and I show you Exhibit 43, and ask you if those are the contracts under which The Connecticut Power Company has delivered, supplied The Connecticut Light and Power Company, with electric energy at Bristol since August 26th, 1935?

* * * * * *

The Witness: No, sir.

By Mr. Wahrenbrock: *Q* Are these the contracts under which The Connecticut Power Company has supplied The Connecticut Light and Power Company at Pole 110, in Portland? *A* The agreement of August, 1930 was modified by a letter signed by The Connecticut Power Company and The Connecticut [*2069*] Light and Power Company, after they became possessed of the property of the Central Connecticut Power and Light Company, which continued in effect until Exhibit 25, being the contract of December 16th, 1936, became effective.

[*2070*] *Q* Have you a copy of that letter to which you have referred? *A* May I refer to Mr. Barney? I think Mr. Barney has one.

Q Certainly. *A* I am not sure whether I have one or not, sir.

Q I show you a copy of a letter dated February 23, 1933, addressed to The Connecticut Light and Power Company over the signature of yourself, and ask you if you recognize that as a let-

ter to which you have just referred, which is the copy just handed to me by Mr. Barney? *A* It is, and I gave it to Mr. Barney.

* * * * * * [*2071*]

Mr. Wahrenbrock: Having handed one copy to respondent's counsel, I now ask that this be marked for identification as Exhibit No. 72.

Trial Examiner: The document will be so marked.

(The document referred to was marked as Exhibit No. 72 for Identification.)

Mr. Branch: What is the purpose of this? This isn't offered for evidence, is it?

Mr. Wahrenbrock: I am about to do so now.

I offer Exhibit No. 72 for Identification in evidence and request an opportunity to prepare a copy therefrom for myself.

* * * * * * [*2072*]

(Exhibit 72 for Identification received in evidence as Exhibit 72).

By Mr. Wahrenbrock: *Q* Mr. Colvin, I show you Exhibits 51, 8, 9, and 10, and ask you if those are the contracts under which The Connecticut Power Company had delivered electric energy to The Connecticut Light and Power Company at Bristol since August 26, 1935?

* * * * * *

The Witness: Exhibit 51 is a contract made November 1, 1930, which superseded agreements with the Bristol and Plainville Tramway Company, dated August 9, 1916, and also an agreement of March 24, 1917, an agreement with the Eastern Connecticut Power, dated March 27, 1920, and November—with a question mark on my copy—16, 1922, and stating that those [*2073*] companies had been merged into The Connecticut Light and Power Company, and under this agreement The Connecticut Light and Power Company agreed to purchase energy at Bristol.

Trial Examiner: In connection with the question mark to which you referred, is there a mark written in over the November?

The Witness: I can't see whether—there is something written over it. I think it is "March", and that contract was to run until February 17, 1943.

The contract dated December 16, 1936, superseded the contract, Exhibit 51, which has just been described, and is a copy of a contract between The Connecticut Power Company and The Connecticut Light and Power Company, covering the supply of energy to Bristol, and I believe is a photographic reproduction of a copy of that contract from the files of the Federal Power Commission. That is Exhibit No. 8. The letter of January 2, designated Exhibit 9—

Trial Examiner: State the year, please.

The Witness: January 2, 1940, is a photographic reproduction from the files of the Federal Power Commission, of a modification of the price stated in Exhibit 8.

Exhibit 10, is a letter dated January 4, 1940, and I believe is a photographic reproduction from the files of the Federal Power Commission, referring to the letter of January 2, [2074] signed on behalf of The Connecticut Light and Power Company, and approved and accepted by Mr. Knowlton and on behalf of The Connecticut Power Company, by the witness, which contains one other item, and that is a payment, a payment of $2,000 per month, shown in Article 4 of Exhibit 8, is eliminated.

Q Do those exhibits, 51, 8, 9, and 10, constitute all the agreements under which electric energy was sold or has been sold by The Connecticut Power Company to the Connecticut Light and Power Company at Bristol, since August 26, 1935? *A* As far as I know.

Q And you do have knowledge of that subject do you not? *A* Yes, sir.

Q I direct your attention now, Mr. Colvin, to Exhibit No. 37.

Trial Examiner: Before you proceed with that, I would like to ask the witness one question. I am not sure, a moment ago, whether you referred to the letter of January 2nd as being Exhibit No. 9. Did you?

The Witness: The exhibit has left me now. As I understood, the exhibits were those letters.

* * * * * * [2076]

Q Referring to Exhibit 37, will you explain what that agreement is? *A* Exhibit 37 purports to be a copy of a contract made June 6, 1937, between The Hartford Electric Light Company and The Connecticut Power Company. The purpose of this agreement is that The Connecticut Power Company may be assured of a supply of electric energy for delivery to The Connecticut Light and Power Company at Bristol, in accordance with the contract made December 16, 1936, between The Connecticut Light and Power Company and The Connecticut Power Company. A copy of the contract of December 16, 1936, between The Connecticut Power Company and The Connecticut Light and Power Company [2077] forms the last six pages of the exhibit.

Q Now, prior to June 8, 1937, what provision had The Connecticut Power Company made for firm capacity to enable it to carry the Bristol load? *A* It had made none.

Q. Where did the Connecticut Power Company obtain the energy with which it supplied the Bristol load, or under what arrangements did it obtain that energy? I will frame the question to ask, under what arrangements did it actually obtain the electric energy which it supplied? *A* It obtained it from The Hartford Electric Light Company by verbal arrangement, and my understanding is that the terms were in general accord with that outlined in Exhibit 37, covering the supply subsequent to June 8, 1937.

* * * * * * [2078]

Q Mr. Colvin, in referring to an arrangement, did you mean the Connecticut Valley Power Exchange arrangement? *A* The Connecticut Valley Power Exchange has never been concerned with the supply of power to Bristol.

Q Was there any actual specific agreement between The Connecticut Power Company and The Hartford Electric Light Company, to enable The Connecticut Power Company to supply Bristol prior to June 8th, 1937? *A* I have answered that there was no specific agreement, but the fact is that it was supplied.

* * * * * * [2088]

Q I would like to go on and direct your attention to the facilities of The Connecticut Light and Power Company at Bristol, and ask you who owns the metering equipment by which the energy delivered to The Connecticut Light and Power Company at Bristol is measured? *A* The metering equipment at Bristol through which The Connecticut Power Company makes deliveries to The Connecticut Light and Power Company is owned by The Connecticut Light and Power Company.

Q What does that equipment consist of? *A* It consists of current and potential transformers.

Q I am sorry, I didn't understand. *A* Current and potential transformers, a device for recording the demand and a device for recording the kilowatt-hours.

Q Where are the current transformers to which you refer located? *A* They are on the 66,000 volt circuits.

[2089] *Q* Are they what are commonly referred to as Niagara-type current transformers? *A* I believe so.

Q The potential transformers are separate transformers? *A* I have no recollection of seeing the specific potential transformers which supply that.

Q Where are the meter instruments located? *A* Within the property of The Connecticut Light and Power Company.

Q Inside the substation building at Bristol? *A* Inside the building at Bristol.

Q I notice that you were referring to a document before you answered the question as to the ownership of the metering equipment. Were you referring to the contract for the sale of electric energy between the two companies? *A* I was.

Q And what is the date of that contract? *A* December 16, 1936. The reason I referred to it is that under Article 3 at the top of page 2 of the exhibit, as I have it, is the statement: "Said electric power shall be in the form of three phase, 60 cycle alternating current, and shall be delivered and measured at approximately 66,000 volts, suitable metering equipment furnished and installed by the buyer at the substation of the buyer in the City of Bristol."

[*2090*] *Q* Is that contract to which you are referring Exhibit 8? *A* Exhibit 8 is a photographic reproduction from the files of the Federal Power Commission of a copy of the contract filed with them in Washington, and the paragraph which I read in the answer to the preceding question is the last sentence in Article 3 at the top of page 2 of Exhibit 8.

Q Thank you.

* * * * * * [*2091*]

Mr. Wahrenbrock: During the recess the witness has reminded me of the request which I addressed to him yesterday, with respect to the operating instructions for the Bristol operator.

With the consent of respondent's counsel, I would like to ask Mr. Colvin if he has brought with him those instructions.

The Witness: I have a copy of those instructions.

By Mr. Wahrenbrock: *Q* Is the copy which you have a signed copy? *A* It is.

Q Will you read into the record the instructions which you have? *A* First may I correct my testimony of yesterday's that the copy bore the signature of Mr. Whiting? Former editions of these rules bore Mr. Whiting's signature. When Mr. Menke was promoted to be superintendent of both the lines and the stations, for organization reasons his signature was substituted.

This copy has been obtained from The Connecticut Company's file at Thomaston. It reads:

"The Connecticut Power Company. Operating Rules, Bristol Operators. May 13, 1940.

[2092] "(1) All power off, open Numbers 1 and 2 line switches at Bristol.

"(2) Put load on line first found alive.

"(3) If load is put in either line without orders, do not close the other line switch.

"(4) If private telephone is out of order, use the Connecticut Power Company commercial phone No. 4387.

"(5) All routine high-line switching should be done under orders from the Hartford Dispatcher.

"Note: When power has been off fifteen seconds, the Falls Village switch at 474 will trip automatic."

Then there has been added in pen and ink, "When No. 2 line is dead, open U. V. Bell knife-switch before closing Falls Village switch."

Signed: "D. Douglass" and the signature typewritten, signed "D. H. Menke", and the signature typewritten, and marked "Copy to A. D. Colvin, F. A. Whiting, C. W. Mayott, D. Douglass and D. H. Menke."

Mr Branch: May I see that, please?

Mr. Wahrenbrock: I hand the original to Mr. Branch.

[2093] By Mr. Wahrenbrock: *Q* You don't have another copy of it? *A* No, sir. I was up until 11:30 to get that out. When Mr. Barney arrives we may have a duplicate.

Mr. Branch: Thank you.

By Mr. Wahrenbrock: *Q* Mr. Colvin, I would like to have you now state the companies by whom each of the men whose names appear in those instructions, or on those instructions, by what companies they are employed, and what their positions in those companies are. *A* Mr. Colvin is executive vice-president of The Connecticut Power Company.

Q That is yourself? *A* Yes, sir. Mr. Whiting is manager of the Housatonic division of The Connecticut Power Company.

Mr. Mayott is manager of the Connecticut Valley Power Exchange.

Mr. Douglass is the superintendent of power of The Hartford Electric Light Company. Mr. Menke is the superintendent of both the 66,000 volt system and the Falls Village station of the Connecticut Power Company.

* * * * * * [2094]

Cross Examination by Mr. SMITH.

Q Mr. Colvin, are any of the names appearing on that operator's instruction sheet that you have just read employees or officials of The Connecticut Light and Power Company? *A* No, sir.

Q Now, I understood you to say yesterday that that switch running from The Connecticut Light and Power Company substation to Bristol Mountain, was owned and operated by The Connecticut Power Company. Is that correct? The meter? *A* If I understood your question correctly, you said the switch running from Bristol to Bristol Mountain.

Q The switch and the line operating the switch? *A* The line running to the top of Bristol Mountain is owned and operated by The Connecticut Power Company. The switches located at Tower 474 at the top of Bristol Mountain are owned and operated by The Connecticut Power Company, except at such times as the Bristol operator may act as an agent of The Connecticut Power Company.

Q And those times when he so acts, those are under orders of The Connecticut Power Company, are they? *A* I have just read the memorandum which is headed, "The Connecticut Power Company operating rules, Bristol operators." A copy of this, I am told, is posted in Bristol. [2095] The telephone installed in Bristol, No. 4387, is paid for by The Connecticut Power Company to provide communications, and I assume that those instructions have the approval of the supervisory force of The Connecticut Light and Power Company, and the purpose of them is to expedite service when an interruption may occur at Bristol.

Q Is there any other purpose, directing your attention, if you

will, to your own employees. I will suggest to you the safety of your own employees.

Mr. Wahrenbrock: Mr. Examiner, I think the question is unclear, and that it ought to be clarified for a proper understanding of the question.

Trial Examiner: Well, I don't know that the question was complete. I am not sure that Mr. Smith had completed his question.

Mr. Smith: I will reframe it, Mr. Examiner.

By Mr. Smith: *Q* Mr. Colvin, you stated that the purpose for operation under the rules was the maintenance of service at Bristol. I ask you if there are any other reasons why this switching equipment at Bristol Mountain is operated under orders from The Connecticut Power Company? *A* Under the rules of the Connecticut Public Utility Commission it is necessary to tag out at both ends and ground a high voltage line on which a man is to work. It is therefore [*2096*] necessary that someone tag out the line from the Bristol substation to the Tower 474 if a man is to work on that line. That will probably be done in normal operation in the presence of an employee of The Connecticut Power Company, and in an emergency would probably be done by a person in the employ of the Connecticut Light and Power Company, in response to a telephone request and confirmation that he had carried out the instructions that he had received.

Q Mr. Colvin, I show you a map entitled "Connecticut Minor Civil Divisions", and I show a copy to the Examiner and one to Mr. Wahrenbrock, and ask you what that is. *A* It is a copy of a map which itself was prepared by the Bureau of the Census, and to which has been added certain designations, and a map that was used, I believe, as Exhibit 8 in the case of The Hartford Electric Light Company before the Federal Power Commission.

Q And does this map show the State of Connecticut? *A* It does.

Q And on this map does there appear the C.P. 1 and C.P. 2 lines and the D-3 and C-4 lines of The Connecticut Power Company? *A* May I interpose a correction? It is C-3 and D-4.

Q C-3 and D-4. Thank you.

Mr. Wahrenbrock: Mr. Examiner, I object to this line of questioning, and move that the last answer be stricken on the [*2097*] ground that in the first place it goes beyond cross-examination. In the second place the respondent, if it has a showing it wishes to make chief, it can do so by calling this witness, without doing so on cross-examination. In the third place, it does not appear that this was prepared by the witness, that he had knowledge of how it was prepared, and again, the question was not directed to any particular time.

Mr. Smith: Mr. Examiner, my questions are simply preliminary to offering this for identification, and I think Mr. Colvin must first state what is on the map and who drew it, how it was prepared. I intend to sufficiently identify it.

Trial Examiner: Do you intend to explore his knowledge of the preparation of the map?

Mr. Smith: I do. I think Mr. Wahrenbrock on direct examination went in to all of the facilities shown on this map.

Trial Examiner: Then your purpose is the connection with that portion of the direct examination?

Mr. Smith: Yes.

Trial Examiner: I think it is related to the direct examination. Counsel may proceed. The objection from Commission counsel is overruled.

Mr. Wahrenbrock: How about the matter of the date, Mr. Examiner?

Trial Examiner: That may be established. We can tell more about that later.

[*2098*] By Mr. Smith: *Q* Does this map, Mr. Colvin, purport to show certain facilities of The Connecticut Power Company? *A* It does.

Q As of what date are these facilities depicted on this map? *A* The map bears no date, but I believe that I identified it as Exhibit 8 in the case of The Hartford Electric Light Company before

the Federal Power Commission, and can only identify the date in that way.

Q Do you remember when The Hartford Electric Light Company case was tried?

Mr. Wahrenbrock: Mr. Examiner, I object to that line of inquiry, to establish the date. An exhibit in that case may have represented facilities as of almost any date prior to the date of the hearing. It certainly would not, in itself, fix the date of this exhibit, if it was an exhibit.

Trial Examiner: It seems to me we should have a little more definite record of the date. It may be that you will be able to get this from some of your other witnesses.

By Mr. Smith: *Q* Mr. Colvin, are you able to state, directing your attention to the present time, January, 1941, we will say, whether or not this map is a correct representation of the facilities of The Connecticut Power Company as of that date?

[*2099*] Mr. Wahrenbrock: Mr. Examiner, I object to that question. It is obvious from the map that this does not represent all of the facilities of that Company. There has been no description of what facilities it does represent, if it represents facilities.

Trial Examiner: I think that may be further explained. The objection is overruled for the present. The map has not yet been offered in evidence.

The Witness: May I have the question?

Trial Examiner: The question will be read back for the benefit of the witness.

(Question read.)

Mr. Smith: July, 1941, I meant to say.

Mr. Wahrenbrock: Mr. Examiner, I object to that question, because on the record as already made in this case it appears that there are facilities of the—

Trial Examiner: That has nothing to do with the admissibility of this question, Mr. Wahrenbrock. That may be an objection to the later admission of the map, but it does not affect the admissibility of the question. The witness may answer.

A The facilities indicated on the map are correct, I believe, as of July, 1941. They are not a complete diagram of the facilities of The Connecticut Power Company.

By Mr. Smith: [*2100*] *Q* Who prepared this map, if you know, Mr. Colvin? *A* I don't know the particular draftsman who prepared it. The Connecticut Power Company has a negative of this map in its files, in the files of its engineering department at New London, from which the prints were made.

Q Was this prepared under your direction? *A* I approved it after it had been prepared.

Mr. Smith: I ask that this be marked as Exhibit No. 73 for identification.

Trial Examiner: It will be so marked.

(Document referred to was marked as Exhibit Number 73 for Identification.)

By Mr. Smith: *Q* Mr. Colvin, are the lines of The Connecticut Power Company shown on this map, beginning with the point "H" at the top of the map here, "Suffield" and running south and west to the point "1" at Salsbury? Are these lines correctly represented as they now are and have been since August 25, 1935?

Mr. Wahrenbrock: Mr. Examiner, I object to that question as going beyond the scope of the cross-examination. I obtained from this witness no testimony, asked him no questions with respect to the "H.-A." lines and with respect to the C. P. lines. I asked him only questions incidental to the facilities at Bristol and Falls Village. It certainly is beyond the [*2101*] scope of direct examination.

Mr. Smith: Mr. Examiner, that map simply purports, I believe it has been testified, to show the C. P. lines about which we have had so much testimony in this case, and Mr. Wahrenbrock on direct examination, asked a great many questions about these lines and about the substations located along the lines. I simply want to discover from Mr. Colvin whether or not this map correctly represents these lines and the substations from the passage of the Act

to date. He stated that they do represent them correctly now, and I simply wish to get that back to the passage of the Act.

[*2102*] Trial Examiner: I think counsel may test the general accuracy of the map by questions regarding portions which perhaps are not directly responsive as to those particular questions on the direct examination, other portions of the map being responsive to the direct examination. The objection of Commission's counsel is overruled. You may proceed.

Mr. Smith: Is there a question pending?

Trial Examiner: There is a pending question. Will the reporter read it.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: I doubt if I can answer the question as phrased.

Mr. Smith: I will reframe the question.

By Mr. Smith: *Q* You have testified that the depiction of the lines of The Connecticut Power Company on the map are correct as of the present date? *A* Yes, sir.

Q Now, what changes, if any, have there been since August 24, 1935, to date, on these lines which are not shown on the map? *A* In slightly above the center of the map, at the point or near the point where the town of East Hartford joins [*2103*] the town of Glastenbury, you will find the letters "G" and "L", and a short U-shaped connection between two lines which connect with the short dash running vertically on the sheet to a point called "L". I do not recall the date, but that line was not originally owned by The Connecticut Power Company. It is now owned by The Connecticut Power Company.

Q Are there any other changes except that which you have just described? *A* Subject to verification on the dates, in the Town of Portland, there is a triangle, the figure 14 opposite, which is designated at the Collins Hill substation. My impression is that that was not the property of The Connecticut Power Company in 1935, but is now the property of The Connecticut Power Company.

Q Are there any other changes? *A* I do not note any other changes.

Mr. Smith: I offer Exhibit No. 73 for Identification in evidence.

Mr. Wahrenbrock: Mr. Examiner, I object to that as going beyond the scope of proper cross-examination, and as not sufficiently proved in that the witness has not been able to state that it was prepared by him or under his supervision.

Trial Examiner: I think the last point is well taken. The statement of the witness that it was later approved is hardly equivalent to the statement that it was prepared under [*2104*] his direction. Isn't it possible for you in your case to call the draftsman who prepared the map and identify it? It would be a much more proper way of getting it into the record.

Mr. Smith: I believe the only proof to date of the CP lines has been put in by respondent's counsel, a one-line diagram—excuse me, Commission's counsel—a one-line diagram showing the same line, in which there was no offer of proof as to its correctness, and the only proof as to its preparation was that it had been prepared by one of the Commission's engineers.

Now, Mr. Colvin has testified as to this map that it was prepared by one of many draftsmen of The Connecticut Power Company, that he examined it after it was prepared, and approved it, and that it was correct.

Trial Examiner: If the witness can state that his duties consist of the approval engineering data, that may clarify the situation.

By Mr. Smith: *Q* Will you describe what your duties for The Connecticut Power Company are? *A* The duties are largely as described by the title, executive vice-president. They include the general supervision of the six divisions in which The Connecticut Power Company is organized. The director of engineering at The Connecticut Power Company, Mr. Cecil W. Brown, reports to me all [*2105*] estimates for construction of new property, the retirement of old—they pass through my hands. I am generally familiar with the construction work that is going on in the field. I visit the various divisions as often as time permits. I also spend

a great deal of time in connection with questionnaires from various sources, and also have to do with the corporate affairs of the company, such as the signature on stock certificates and things of that sort. I am a director of the company and attend directors' meetings, and at such meetings do present to the directors of the company, things that require their attention, with which I am especially familiar.

Q Now, has this map or a similar map to this ever been used in connection with your directors' meetings? *A* A copy of this map is on file and is carried to each directors' meeting, so that we may tell the directors by showing it to them what we are talking about.

Q And were you responsible for that practice? *A* The request came from one of the other directors that such a map be provided, and this was the map that was used.

Q And did you have it provided? *A* Yes. That is, I asked the secretary to have one in his custody at each directors' meeting.

Q And after it was prepared, did you examine this map? *A* It was a print of a negative we had in the drafting [*2106*] room, and my examination was a limited one such as I have given it this morning.

Mr. Smith: I now renew my offer of Exhibit No. 73 for Identification in evidence.

Mr. Wahrenbrock: I object on the same grounds, and will say that I shall have some further objections to base on further examination of the witness when I may examine him.

Trial Examiner: Pending those suggested questions, the witness has been just a little indefinite as to his willingness to assume full responsibility for the direction and preparation, and I will reserve decision temporarily on its admissibility.

By Mr. Smith: *Q* Mr. Colvin, do you know how I came in possession of the map which is in front of you? *A* Yes, sir.

Q Will you describe how I did? *A* You called on me at my office in New London. I showed you a copy of the map. You asked me if you might have a copy of it, and agreed to pay for same, and I told you that you might.

Q Did you have copies prepared for me? *A* Yes, sir.

Q Directing your attention to Exhibit 73 for Identification, which has been offered as proof, will you describe [*2107*] the facilities of the Connecticut Power Company located in the vicinity of the figure "F-15", which I believe is the South Meadow substation. *A* I assume this is Exhibit 73, sir?

Q Exhibit 73 for Identification, and the Examiner is reserving his decision. *A* At the location indicated by the symbol "F-15", in the town marked Hartford City, under the legend 15 is the South Meadow substation of The Connecticut Power Company at Hartford, and "F" under the same legend states, "To and from The Hartford Electric Light Company", meaning energy going to and from The Hartford Electric Light Company at that point.

If I may limit my description of the facilities existing at location 15 as prior to the end of March, 1941, I would state that The Connecticut Power Company transformer station at South Meadow is a modern outdoor type station, with structural steel supports. It includes the usual apparatus and material found in such a station, including oil circuit breakers, disconnecting switches, instrument transformers, lightning arresters, bus bars, oil piping, oil storage, cooling and filtering equipment, conductors for 11,000 volt circuits, and three sets of 11,00 volt connections to the wall bushings of the South Meadow steam plant of The Hartford Electric Light Company. The high voltage bus is in two sections, the east section serving the circuits connecting with the lines of [*2108*] the Turners Falls Power and Electric Company, and the west section circuits connecting with the lines to Falls Village. There are five large transformers installed in this transformer station. They include one 12,000 k.v.a. transformer, 69,300 to 11,000 volts, General Electric make, serial No. 2,739,120; two 7500 k.v.a. transformers, 69,300 to 11,000 volts, General Electric make, serial numbers 2,297,332 and 2,297,333. There are also two 25,000 k.v.a. auto-transformers, 66,000 to 69,300 volts, General Electric make, serial numbers 4,126,954, and also 4,126,955. The rating specified is for these

transformers when they are operating as self-cooled units. The two auto-transformers are connected in the leads to the east bus supplying the circuits to Agawam. These auto-transformers are necessary to adjust the voltage between the two systems, and particularly to compensate for the voltage loss in transmission, as at certain periods power may be being sent by The Connecticut Power Company to Massachusetts, and at other times power may be received by it from Massachusetts in considerable amounts.

The line voltage must be compensated, and it is done by these transformers. It is possible to connect the two 66,000 volt buses by the use of a proper oil circuit breaker and disconnecting switches. The 11,000 volt side of the transformers mentioned are connected to the 11,000 volt bus structure in the South Meadow steam station of The Hartford Electric Light Company.

* * * * * * [*2111*]

A Prior to the end of March, 1941, connections were made to enable Line D-4 to operate at 110,000 volts. This involved the installation of a General Electric 30,000 k.v.a. [*2112*] self-cooled Form D.J. three-phase 60-cycle transformer with a high-voltage winding with taps from a high of 126,500 volts to a low of 93,500 volts, and a secondary winding of 11,000 volts.

The serial number of this transformer is 6506136. The 11,000-volt side of this transformer is connected to the 11,000-volt bus structure in the South Meadow steam station of The Hartford Electric Light Company.

The change of both lines C-3 and D-4 to 110,000 volts has not been completed, as of this date.

By Mr. Smith: *Q* When you say "bus structure", Mr. Colvin, do you mean bus structure in the substation? *A* The connections are made to the conductors in the bus structure in the steam station. Electrical energy may be received from or delivered to the 11,000-volt bus structure in the South Meadow steam station. Such energy whether received or delivered is measured for billing by meters owned by The Hartford Electric Light Company and connected in the bus structure inside the generating station.

Q Would you describe very generally, Mr. Colvin, the system of The Connecticut Power Company as shown on this map, Exhibit 73?

Mr. Wahrenbrock: Mr. Examiner, I object to that question, unless it is limited to the subject matter which has been covered by the witness's testimony on direct.

[*2113*] By Mr. Smith: *Q* And limit, if you will, in your description, the lines of the Company connected to Hartford, Bristol and Falls Village.

Trial Examiner: The witness may proceed.

A Referring to the exhibit, starting at the top center of the map at the point designated as "H", two lines are indicated as running to the City of Hartford.

* * * * * * [*2115*]

Q Would you kindly describe in general the system of The Connecticut Power Company, as shown on the map which you have in your possession? *A* I have generally described the lines from the Massachusetts State line to the South Meadow substation. Now, starting at the South Meadow substation there are two circuits that nominally are 66,000 volts which run to the hydro-electric plant of The Connecticut Power Company on the Housatonic River at Falls Village in the town of Canaan. These circuits are located on private rights-of-way supported by steel towers. Substation taps are made from these circuits in order to supply the Connecticut Power Company's requirements at Middletown, those of The Connecticut Light and Power Company at Bristol, the requirements of The Connecticut Power Company at Thomaston and those of The Torrington Electric Light Company at Torrington. These circuits finally terminate through transformers on the 6600-volt bus of The Connecticut Power Company at Falls Village. All of the circuits are three-phase [*2116*] 60-cycle circuits.

Mr. Wahrenbrock: May I have the last few sentences of the answer read, please? I missed one of the expressions.

Trial Examiner: Will the reporter read the last two sentences of the witness's answer?

(The record is read.)

By Mr. Smith: *Q* Have you completed your answer, Mr. Colvin? *A* No, sir. From Falls Village there is a nominal 66,000-volt-line connecting with the Central Hudson Gas & Electric Corporation at Poughkeepsie, New York. This is a single circuit line located on the private right-of-way supported by steel towers. The ownership of The Connecticut Power Company in this line ends at the Connecticut-New York State line, and there are no taps off this circuit in the State of Connecticut. This is also a three-phase, 60-cycle circuit.

Q There was shown to you a contract between The Connecticut Power Company and The Hartford Electric Light Company. I think Exhibit 8, which provided for supply of power by the Connecticut Power Company to The Connecticut Light and Power Company. I want to ask you what the source of primary firm power was for that contract. *A* May I see the exhibit?

Mr. Smith: I hand the witness Exhibit 8.

[2117] *A* (Continuing) Your statement was that it was a contract between The Connecticut Power Company and The Hartford Electric Light Company?

By Mr. Smith: *Q* Between The Connecticut Power Company and The Connecticut Light and Power Company. *A* The source of energy contemplated by this contract was firm power, the steam stations of The Hartford Electric Light Company, the hydro plant of The Connecticut Power Company at Falls Village, and any reserve steam capacity that may have been available at Torrington.

Q That wasn't put in writing, was it, until June of 1937, when The Connecticut Power Company entered into a contract with The Hartford Electric Light Company? *A* Through neglect on the part of either Mr. Barney or the witness, no contract guaranteeing a supply of power to the Connecticut Power Company to carry out this contract was made until June of 1937.

Q Was that contract carried out? *A* It was, sir.

Q Was such firm capacity supplied? *A* It was.

Mr. Wahrenbrock: Mr. Examiner, I am going to object to the last question and ask that the answer be stricken, whether it was firm capacity which was supplied or not is a legal con- [*2118*] clusion and depends on the existence of a contracts committing some capacity to a certain use, and the witness's testimony previously given is that there was no such contract. It is a contradiction in terms.

Trial Examiner: Well, I think firm capacity may have an engineering, as well as a legal meaning.

Mr. Wahrenbrock: Well, not as between two different companies, Mr. Examiner. If I may amplify that and say that Company A owns a huge dependable steam electric generator, that doesn't mean that Company B can depend on it unless Company A is under a contractual obligation to B to allow B to depend upon it. It is a question of contract and contract alone under those circumstances.

Mr. Smith: Mr. Examiner, I believe yesterday Mr. Colvin testified there was a verbal understanding. I simply wish to prove that this verbal understanding was backed up by performance and that was in fact done.

Trial Examiner: You may prove it. The contract does not necessarily have to be in writing.

Mr. Wahrenbrock: Mr. Examiner, I cannot let the statement stand that the evidence of this witness shows that there was a contract, verbal or in writing.

Mr. Smith: I said, Mr. Wahrenbrock, that I believe Mr. Colvin testified that there was a verbal understanding.

[*2119*] Trial Examiner: The objection is overruled and the answer may stand without explanation. The last question has been answered and there is no pending question.

By Mr. Smith: *Q* What is the source of the primary firm power for the interconnected system of The Connecticut Power Company? *A* By "interconnected system of The Connecticut Power Company" we include only the lines from South Meadow substation to Falls Village. The source of power for that line for

firm capacity on that line is covered by contracts, two contracts with The Hartford Electric Light Company, covering their steam generating plant in Hartford, by the hydro-capacity available at Falls Village and whatever reserve capacity may be available at Torrington.

Q Yesterday, Mr. Colvin, you testified in response to questions of Commission's counsel as to facilities at Torrington that except for accidental interchange of energy to your knowledge no energy had gone from Torrington to the C.P. line at Torrington since 1929. Do you remember that? *A* Substantially.

Q Do you know of any such accidental interchange of energy? *A* I do not, and there is no way that I could know it. The meter used by The Connecticut Power Company to supply the Torrington Electric Light Company has, according to the recollec- [*2120*] tion of employees of The Connecticut Power Company, been equipped with a ratchet for at least ten years, which means that it could only register the same as your watch. You turn it one way to wind the spring and do not wind the spring when you turn it the other way.

[*2121*] *Q* So to your knowledge, there has been no power which has gone from Torrington to the CP line at Torrington? *A* There has not.

Q Since 1929? *A* That is correct.

Q Can you, with reference to Exhibit 38, which I believe is your system diagram, describe in general terms the connections of The Connecticut Power Company at Torrington with The Connecticut Light and Power Company? *A* I am describing the connections at Torrington as of the present time.

Approximately two and a quarter miles from the Torrington station of The Torrington Electric Light Company, there is a junction point on The Connecticut Power Company's 66,000 volt transmission line, marked on this exhibit as switching tower 276. At this point there are certain disconnecting switches, and two circuits go to the property of The Torrington Electric Light Company, at which point there are three automatic oil switches, and

there are also installed two banks, each consisting of three 2500 k.v.a. transformers, and one 15,000 k.v.a. three-phase transformers which are nominally 66,000 volts on the high voltage side, and 2300 volts on the low tension side, and feed into the 2300 volt bus of The Torrington Electric Light Company. There is also installed at Torrington a 4,000 k.v.a. [*2122*] rotary condenser on the 2300 volt bus that is the property of The Connecticut Power Company.

There is installed at Torrington the usual lightning arresters, and also meters for measurement of energy delivered to Torrington.

Q What happeens to the— I withdraw that. At what voltage do you deliver at Torrington? *A* At nominally 2300 volts.

Q Do you know of what voltage The Torrington Electric Light Company distributes to its customers? *A* Only generally that it has in general a 2300 volt distribution system.

Mr. Wahrenbrock: I object to the answer and move that it be stricken as not responsive. The question was at what voltage does the Torrington Electric Light Company deliver to its customers.

Trial Examiner: I think he made a statement generally that they delivered 2300 volts.

Mr. Wahrenbrock: I think the witness will understand that is not responsive to the question.

Trial Examiner: But if it is a fact, it is in response to the question. It seems to me the answer is perfectly clear. If the witness is in error, that is another matter.

The Witness: May I have the question?

Trial Examiner: Read the question back for the witness.

[*2123*] (Whereupon the last question as above recorded, was read by the reporter.)

The Witness: I understand the question to mean at what voltage it distributed electric energy to reach its customers, and did not intend to describe the apparatus used on the distribution system of The Torrington Electric Light Company.

Mr. Wahrenbrock: With that explanation, I renew my motion that the answer be stricken, Mr. Examiner.

Trial Examiner: Well, I don't think on the face of it the answer necessarily deserves to be stricken. The distribution may be to industrial customers. I understood him to say it was distributed at 2300 volts.

Mr. Wahrenbrock: That isn't my understanding of the answer.

Trial Examiner: Read back the answer.

(Whereupon the last answer as above recorded, was read by the reporter.)

Trial Examiner: If there is anything further Commission's counsel may bring it out on redirect.

By Mr. Smith: *Q* Mr. Colvin, you testified yesterday that all the changes on Exhibit No. 38, and wiring connections between The Connecticut Power Company and The Torrington Electric Light Company are shown on that diagram. I wanted to ask you if you know of your own knowledge of any changes The Torrington [*2124*] Electric Light Company might have made with any other company?

Mr. Wahrenbrock: Mr. Examiner, I object to that as hypothetical.

Trial Examiner: On what ground?

Mr. Wahrenbrock: On the ground it is a hypothetical question not shown to be based on any facts in the record. What The Torrington Electric Light Company might have done under what circumstances doesn't appear, and the basis of this witness's knowledge is not shown.

Trial Examiner: He is asking him as to whether he has any knowledge. It seems to me that is a preliminary question. He hasn't asked what the changes were. He has a right to know whether he does have knowledge.

The witness may proceed.

The Witness: I testified yesterday that The Connecticut Power Company had no official notice of the changes in Torrington, that certain of its officers had informal information that the Torring-

ton steam plant was being operated, and I testified that it was my understanding that it was being operated not only in connection with what may be the Winsted load of The Connecticut Light and Power Company, but that I was also informed that it involved certain street lighting facilities of The Torrington Electric Light Company. I have verified the question of street lighting facilities since I answered the question, and I have been assured that that is [*2125*] so.

By Mr. Smith: *Q.* Do you know of your own knowledge whether these changes in operation by The Torrington Electric Light Company call for any changes in wiring connections between The Torrington Electric Light Company and The Connecticut Light and Power Company? *A* If the steam plant at Torrington was to serve only a portion of the load, certain changes would have been necessary on the 2300 volt buses or connections of The Torrington Electric Light Company.

Q You don't purport to show those changes on Exhibit No. 38, do you? *A* Why, no, sir. We do not even show the generating plant of The Torrington Electric Light Company.

Q Mr. Colvin, you were asked certain questions concerning Bristol, point of delivery and point of metering.

Trial Examiner: Before you start on a new point of investigation, we will now take a ten-minute recess.

(At this point a short recess was taken, after which the hearing was resumed.)

Trial Examiner: The hearing will now be in order.

By Mr. Smith: *Q* Mr. Colvin, directing your attention to the supply by The Connecticut Power Company at Bristol, I show you Exhibit 8, [*2126*] and ask you if that is the contract, together with Exhibits 9 and 10, two-extension letters, under which the company is now supplying The Connecticut Power Company at Bristol, and has been since January 1, 1937.

Mr. Wahrenbrock: Mr. Examiner, I object to that. It is merely repetitive of what has been clearly brought out several times already. I can see no need of further proving that. I take it there

is no intention of impeaching the witness's testimony on that. It seems to me it is just delaying the progress of the case to go into that again.

Trial Examiner: I think it is repetition. It may be to lay the ground for a further question, and of course, counsel has the right to cross-examine the witness as to his statements made on direct examination.

However, I don't believe that those exhibits as stated have been anything but marked for identification. At least if they are, it doesn't show it in the transcript.

Mr. Wahrenbrock: All those exhibits have been received in evidence, Mr. Examiner.

Trial Examiner: Will you state the date on which 8, 9 and 10 were received in evidence? I was looking through the transcript and couldn't find it.

Mr. Wahrenbrock: The afternoon session of the 15th.

[*2127*] Trial Examiner: Do you have a copy of the transcript of the 15th there?

Mr. Wahrenbrock: Yes, I am sure I do. I hand you the afternoon session which has a list of exhibits and it is not included in the list as there stated.

Trial Examiner: Will you state what page the exhibit was received on?

Mr. Wahrenbrock: Well, that will require a search.

Trial Examiner: If you will do that between now and when we come back this afternoon, because I would like to have that correction made in the record, and also in regard to Exhibit 37.

You may proceed.

By Mr. Smith: *Q* The answer is—? *A* May I have the question? Exhibit 8 handed me is a photographic reproduction apparently from the files of the Federal Power Commission of the contract between The Connecticut Power Company and The Connecticut Light and Power Company, dated December 16th, 1936, covering the supply of energy to Bristol.

Q Directing your attention to Article 4 of this contract, will you state how the charge for energy sold by The Connecticut Power Company to The Connecticut Light and Power Company was determined? *A* Article 4 states that the price to be paid by the buyer shall consist of a demand charge of $1.50 per kilowatt [*2128*] per month of demand, and an energy charge of 4 mills per kilowatt-hour, plus the sum of $2,000. The items of 4 mills and $2,000 are covered by the exhibits or the modifying letters which follow. It then states that the energy charge is based on the cost to the seller, that is, The Connecticut Power Company, of fuel, meeting certain specifications, and then, "and costing $5.30 per net ton delivered in the bunkers of The Hartford Electric Light Company's power stations at Hartford. Should the cost of fuel on such basis be more than $5.55 or less than $5.05 per net ton, then for each one cent increase above $5.55 or decrease below $5.05, the energy charges shall be increased or decreased respectively by 7/10,000ths of a cent per kilowatt-hour."

Q So is it a fact that the energy charge is determined by the cost of fuel to The Hartford Electric Light Company? *A* It is.

Q Has that fact any bearing on your statement that the supply of power by The Connecticut Power Company to The Connecticut Light and Power Company is based on primary firm capacity of The Hartford Electric Light Company? *A* I was not a signatory to this contract, but certainly the officers of both companies who did sign it agreed that the basis of electric energy delivered in Bristol should be affected and determined by the cost of fuel at the plants of The Hartford [*2129*] Electric Light Company.

Mr. Wahrenbrock: Mr. Examiner, in view of the first clause of the witness's response, I move to strike the balance of the response.

Trial Examiner: I think in view of the first clause the balance could be at best hearsay. The motion is granted.

By Mr. Smith: *Q* Mr. Colvin, you testified that the source of energy at Bristol was The Hartford Electric Light Company. That is, the primary source was The Hartford Electric Light Company. Can you give me a reason for that statement?

Mr. Wahrenbrock: Mr. Examiner, I object to this line of inquiry, and to this particular question.

Trial Examiner: Does counsel deny that the witness so testified yesterday?

Mr. Wahrenbrock: Yes, he didn't say anything about the primary source. He may have testified with respect to contract, which designates a source of prime power. He didn't say anything about a prime source of electric energy.

Mr. Smith: I believe he so testified ten or fifteen minutes prior to the recess this morning.

Mr. Wahrenbrock: I have no recollection of any testimony except the testimony with respect to prime power, not anything about a prime source, whatever a prime source is.

Trial Examiner: Well, are you in a position to find the [*2130*] record of what he testified to this morning? Do you have the transcript there?

Mr. Smith: No, I have not, Mr. Examiner.

Trial Examiner: Can the reporter obtain it for us?

Mr. Smith: Perhaps I could ask him that question now.

By Mr. Smith: *Q* What is the prime source of power at Bristol?

Mr. Wahrenbrock: Mr. Examiner, I object to that on several grounds. In the first place, the evidence shows where the power comes from at the times which are significant to this proceeding. It is irrelevant and immaterial where it comes from at other times, or where they could have obtained it from if they hadn't obtained it from where they did obtain it. The important thing is where they do obtain it. That has been shown. Anything else is irrelevant and immaterial and I object to this on that ground. In the second place, it is not indicated what is meant by "prime source". In the third place, the best evidence is the contracts, which are already in evidence.

Trial Examiner: I don't see the materiality but it may be relevant and we will admit it for what it is worth. The witness may answer the question. The objection from Commission counsel is overruled.

A I believe that I testified earlier in this session [*2131*] that the source of firm power for Bristol were the steam stations of The Hartford Electric Light Company, the hydro-capacity at Falls Village, and what reserve capacity might be available at Torrington.

* * * * * * [*2133*]

Q Are you able to say, Mr. Colvin, whether there was a similar energy charge as that described in Article 4 of Exhibit 8 prior to January 1, 1937, between The Connecticut Power Company [*2134*] and The Connecticut Light and Power Company?

Mr. Wahrenbrock: Mr. Examiner, I am constrained to object to that. That is shown by better evidence already in the record, Exhibit 51 for Identification. You don't need to go into that by a witness whose knowledge is, as shown by his previous testimony, limited to what the Exhibits show.

Mr. Smith: I believe, Mr. Examiner, that Mr. Colvin has testified about a verbal understanding.

Trial Examiner: Well, is this a verbal understanding during the period in which there was no contract?

Mr. Smith: He has testified that prior to Exhibit 8 that there was a verbal understanding between The Hartford Electric Light Company and The Connecticut Power Company as to supplying the requirements of The Connecticut Power Company to serve Bristol, is that correct, Mr. Colvin?

The Witness: No, sir.

By Mr. Smith: *Q* Well, with whom was that verbal understanding? *A* I testified that there was a verbal agreement or contract between the contract executed December 16th, 1936, marked Exhibit 8, and the execution of the contract in June, 1937, the Exhibit—subject to help—31, which has just been handed me.

Mr. Smith: 37.

A I haven't the exhibit here, and that your question was [*2135*] whether the one prior to Exhibit 8? To that my answer is "No".

[*2136*] *Q* The verbal understanding. *A* Subsequent.

Q Subsequent to December 16, 1936? *A* Yes, sir.

Q And was that verbal understanding similar to the agreement set forth in Exhibit 37, which you referred to just recently? *A* I have already testified that service was rendered under the terms of the contract dated December 16, 1936, to Bristol, and that the bills for such service were in accordance with that contract and were paid.

Q What was the primary source of supply to The Torrington Electric Light Company? *A* Torrington is fed from the same high voltage transmission line as Bristol, and as of any specific date it had the same firm sources of supply.

* * * * * * [*2137*]

Q Mr. Colvin, you have testified that the primary source [*2138*] of supply at Torrington was The Hartford Electric Light Company; is that correct? *A* And that of the hydro plant of Falls Village, the reserve capacity at Torrington.

Q Now, can you give a reason for stating that? *A* That is stated in Exhibit 36, of which I was one of the signatories, and which states the ownership of certain facilities, and what The Connecticut Power Company may expect from the facilities of others for payments specified.

Q Will you now direct your attention, Mr. Colvin, to Exhibit 73. Can you tell us how far it is from the South Meadow substation of The Connecticut Power Company to the Massachusetts State line, following the route of the Connecticut Power Company's Agawam line?

* * * * * * [*2140*]

Q Mr. Colvin, can you do this quickly? *A* I can take the scale that is shown on the map.

Q Let me ask you this, to hasten it up. Is the portion of the line located in Connecticut from the Massachusetts State line to the South Meadow substation, 27.4 miles? *A* Approximately.

Q And from the Massachusetts State line to Agawam, Massachusetts, is it 6.3 miles?

Mr. Wahrenbrock: I object for the same reason, Mr. Examiner. We are getting on the facilities of an entirely different company.

Mr. Smith: This is one company that Mr. Wahrenbrock did specifically ask about, I believe—the Turners Falls Company.

Mr. Wahrenbrock: Let us see the reference.

Trial Examiner: I think we will permit him to go as far as Agawam. You may proceed.

The Witness: Agawam is not shown on the exhibit handed [*2141*] me, but the distance as quoted is substantially correct.

By Mr. Smith: *Q* From the South Meadow substation to Falls Village, following the route of the line as shown on that map, is it approximately 58.75 miles? *A* I believe that is substantially correct.

Q And from Falls Village to the New York State line, following the route of the Falls Village-Poughkeepsie line, is it 7.86 lines?

Mr. Wahrenbrock: Mr. Examiner, I wish to object to that, and point out that all that information is shown on Exhibit No. 38. And I point out that for the purpose of showing that this is merely cumulative and duplicating evidence already in the record, and I see no purpose for putting it in except to delay the proceedings.

Trial Examiner: The objection will be overruled. Counsel may proceed.

The Witness: The question is from Falls Village to the New York line?

By Mr. Smith: *Q* To Poughkeepsie, the New York State line. Is it approximately 7.86 miles? *A* It is so shown on Exhibit 38.

Q Will you now direct your attention to the map, to the Middletown division, and referring to the former supply [*2142*] by The Connecticut Power Company to Pole 110, will you describe how that was supplied by The Connecticut Power Company? *A* It is shown on the Exhibit 73 for Identification. It is shown in greater detail on Exhibit 38. By formerly, I am referring to the period just prior to the discontinuance of the service at Pole 110.

Q Was that July 1, 1939? *A* June 30, 1939, I believe is the correct date. I am starting at what is known as the West Side substation of The Connecticut Power Company in Middletown, and from—

Q Now, I want to interrupt you there, and ask you what that West Side substation did? *A* The West Side substation at Middletown is the point at which the 66,000 volt circuits of The Connecticut Power Company terminate, and the energy is sent out at nominally 4160 volts and nominally 13,800 volts. There is the necessary building transformers, and so forth, installed at that point. The energy that formerly went to Pole 110 prior to its disconnection, left the West Side substation by underground cable, and then crossed the Connecticut River at that time in submarine cables, and came up on wood poles, and went to what is designated as the Wolcott Lane substation, located in the Town of Portland.

Q Did any other circuits of The Connecticut Power Company come out of that West Side substation? [*2143*] *A* Yes, sir.

* * * * * * [*2145*]

Q Will you, Mr. Colvin, now describe whatever lines came out of, first, the Middletown substation? *A* By Middletown substation, reference is again made to the West Side substation located in Middletown. That station supplies the City of Middletown and the surrounding towns. Our distribution in Middletown falls in two voltage classifications—really three at the present moment, in that we are in the process of changing over completely to 4,160 volts, three-phase, but still have a small amount of two-phase remaining. We have a 13,800 volt distribution system that carries the larger factories, and carries the major or the larger part of the energy that we sell at retail in Middletown and the surrounding towns. From this 13,800 volt bus in the West Side substation, underground cables, and then submarine cables, and then aerial cables [*2146*] carried it to the Walcott Lane substation where there were several circuits. Some of those circuits supplied fac-

tories at 13,800 volts, others supplied domestic customers, commercial customers, small power customers in the Town of Portland at 4,160 volts. One circuit continued to pole 110, supplied a group of residential customers on the way, and up until the ownership of certain facilities changed in the Town of Portland, there were transformers installed at what is now shown as Collins Hill, in about the center of the map, three inches from the bottom.

The customers served from Collins Hill were formerly customers of The Connecticut Light and Power Company, and are now customers of The Connecticut Power Company. Leaving pole 110 was a circuit that continued, I believe, served East Hampton and the surrounding territory.

[*2147*] By Mr. Smith: *Q* Do I understand there are taps serving customers off this line running from Wolcott Hill to Pole 110? *A* As of the date of the termination of the contract there was a tap serving a group of residential customers.

Q Can you tell us with reference to this diagram here, 4031-F, how far it is from South Meadow over to Pole 110? Will that take you very much time? *A* I think the only thing I can do is drive it in an automobile.

Q Could you just give us an approximation? *A* On the assumption by the way the line goes?

* * * * * * [*2148*]

Q By referring to Exhibit 38, Mr. Colvin, can you just approximate first the distance from South Meadow along the 66 k. v. line to the Middletown tap? *A* From the South Meadow substation to the Middletown tap, Exhibit 38, shows a distance of 11.04 miles.

Q From the Middletown tap down to the Middletown West Side substation, how far is that?

* * * * * * [*2149*]

A Exhibit 38 shows a distance of 11.04 miles from the South Meadow substation to the Middletown tap, which is known as Point 12.

Trial Examiner: Why can't we save time, Mr. Smith, by getting a statement in the record from the witness? If you want to ask him if all the distances shown on Exhibit 38 are correct, I see no reason for not doing it that way, but I think that would shorten the whole procedure and save going into the question of individual distances.

Mr. Smith: The trouble is, all of the distances are not shown on this map.

By Mr. Smith: *Q* Are all the distances shown on the map correct, Mr. Colvin? *A* All the distances that are shown on the map are taken from the records in our engineering department, and we regard them as correct.

Q Is the distance, the total distance from South Meadow to Pole 110, can that be computed on this map? *A* It cannot be computed from Exhibit 38.

Q Why not? *A* It was testified that Exhibit 38 was a diagram and not [*2150*] a map.

Q Can you get the distance on Exhibit 38 from South Meadow to Middletown? *A* Yes, sir.

Q Can you get the distance on Exhibit 38 from Middletown to Pole 110? *A* No, sir; not on Exhibit 38.

Q Would you give us that distance quickly? *A* Of the order of 5 to 6 miles.

Q Is the distance from South Meadow to the Bristol tap shown on the map? *A* It is shown in various sections, and it is necessary to combine the readings to obtain the total distance.

Q And is the distance from South Meadow to Torrington shown on the map? *A* It is shown in several sections and it is necessary to combine them to get the total distance.

Mr. Wahrenbrock: I understand that counsel's question refers to Exhibit 38.

Mr. Smith: I beg your pardon. Yes, in all instances.

Trial Examiner: Yes, that is so understood. Did you answer, Mr. Colvin?

The Witness: I did, sir.

By Mr. Smith: *Q* And can you figure from Exhibit 38 the distance from [*2151*] Torrington to Falls Village and from Falls Village to Poughkeepsie? *A* It is given from Tower 276 to Falls Village, and it is given from Falls Village to the New York State line on Exhibit 38.

Mr. Smith: No further questions.

Trial Examiner: Any redirect, Mr. Wahrenbrock?

Mr. Wahrenbrock: Yes, Mr. Examiner, a few questions.

Redirect Examination by Mr. WAHRENBROCK.

Q Mr. Colvin, I direct your attention to Exhibit No. 73 for identification, and ask you to point if you will, please, the mode by which this Exhibit purports to identify the point of delivery from The Connecticut Power to The Connecticut Light and Power Company for the latter's Bristol load. *A* It would be indicated by the letter "C" in the town marked "Bristol City".

Q Is the use of a letter the mode of indicating interconnections on this map? *A* The various points on the map are explained under the legend and indicated by a letter or a numeral.

Q How does this map show the point of delivery from The Connecticut Power Company to The Connecticut Light and Power Company to supply the requirements of the latter for the latter's East Hampton District prior to July 1, 1939? [*2152*] *A* If you will refer to the map, to the town marked Portland, and with a triangle, and underneath the legend the number "14" you will find that it is called the Collins Hill substation, and Pole 110 was located a short distance southerly from that point.

Q Is there anything to indicate on the map the position of Pole 110? *A* There is not.

Q Is there any legend on the map to indicate, or any symbol on the map to indicate the existence of a point of delivery at or near Pole 110 of The Connecticut Light and Power Company? *A* There is not.

Q The map does not show a point of delivery to the Connecticut Light and Power Company for the latter's East Hampton dis-

trict? *A* It does not, but I testified that the map was correct as of this date, with the exceptions that I noted.

Q As of what date? *A* As of this date, in July, recalling to you the change of ownership of the lines shown in the town of East Hartford, with the letters "G" and "L".

Trial Examiner: Has the witness completed his answer?

The Witness: That is the only one that occurs to me, but I had in mind that I found the second one, but I cannot [*2153*] find it again at this time, if I had it in previous testimony.

Mr. Wahrenbrock: I would like to have that answer read back to me, please.

Trial Examiner: Will you read the answer for the benefit of Commission counsel?

(The answer is read by the reporter.)

By Mr. Wahrenbrock: *Q* Mr. Colvin, aside from the exception which you mentioned at the points represented by the symbols "G" and "L", having in mind your reservation of that exception, your prior testimony in response to Mr. Smith's questions that Exhibit 73 for identification accurately represented the facilities of The Connecticut Power Company must be subjected to the further qualification that it does not accurately represent those facilities at Pole 110 prior to July 1, 1939, isn't that true? *A* I have testified that the map does not show Pole 110.

Mr. Wahrenbrock: Mr. Examiner, I ask that on the basis of the testimony thus far elicited, Exhibit 73 for identification be not admitted in evidence.

Trial Examiner: I think he stated that it represented the situation at the present time. I don't understand that Pole 110 connection exists today. Is that correct?

Mr. Wahrenbrock: Mr. Examiner, the questioning by the respondent's counsel attempted to establish that this represented the facilities from August 26th, 1935 to the present time and [*2154*] that the map itself does not contain any date or legend which would rebut or show that that was not what it purported to represent.

Mr. Smith: Mr. Examiner, I think that in any of these diagrams, with particular reference to the one-line diagram offered by Commission's counsel, none of these diagrams in a utility can depict a situation at one particular time, they are not static, and Mr. Colvin has given sufficient explanation, so that this map is simply a map which shows in general outlines the C.P. lines about which we have heard so much talk in relation to the map of the State of Connecticut, and was offered for that purpose.

I think the only other evidence which has been offered is the one-line diagram, and that is the purpose.

Trial Examiner: If the map is only offered for that purpose, it will be received in evidence as Exhibit Number 73.

(Document previously marked Exhibit 73 for Identification was marked Exhibit Number 73 in Evidence.)

Mr. Wahrenbrock: I expect that I will be able to conclude with this matter in a matter of ten minutes or more, so that we can adjourn at our usual hour.

Trial Examiner: All right, you may proceed.

By Mr. Wahrenbrock: *Q* Mr. Colvin, I would like to direct your attention to your testimony in response to questions by Mr. Smith, in which [*2155*] you referred to the C.P. 1 and C.P. 2 lines as terminating through transformers on the 66 k. v. bus at Falls Village, and ask you to explain what you meant by that expression, if you will. *A* If I may refer you to Exhibit 38, in the upper left-hand corner, there is the designation of the Falls Village station, and it shows the C.P. No. 2 at the top of the sheet, C. P. No. 1 at the bottom of the sheet, coming through suitable oil switches and terminating on a heavy line which is marked "6.6 k. v.".

Q That is the point I wanted to clear up. It doesn't terminate on a 66 k. v. bus through transformers, does it? *A* The 66 k. v. lines are connected by a disconnecting switch shown above the word "Hydro".

Q Then your statement that the C. P. 1 and C. P. 2 lines ter-

minate through transformers on the 66 k. v. bus is not accurate? *A* If I said 66 k. v. bus I wish to correct it to read 6.6 k. v. bus.

Q In making the statement that you did with respect to the 2,300-volt facilities of The Torrington Electric Light Company, did you mean to be understood as saying that any customers of that company are served at 2,300 volts? *A* I believe certain of the customers are served at 2,300 volts.

[*2156*] *Q* What companies? *A* I believe the Torrington Company is served at 2300 volts.

Q Any others? *A* That is the one that I had recalled immediately.

Q At what voltage are most of the customers of The Torrington Electric Light Company served? *A* I testified that my knowledge of the Torrington distribution system was a general one. I assume the residential customers are served at the usual residential voltage, maybe either nominally 110 or 110-220. The power customers are served with whatever voltage meets their requirements, as far as metering and delivery goes.

Q I wish to refer to Exhibit 37, which is the contract of June 8, 1937, I believe, and to your testimony with respect to the situation prior to the execution of that contract. I believe you referred to it as a verbal understanding. *A* May I see the exhibit?

Q I thought it was before you there. You referred to it on cross-examination. *A* I gave everything I had, I think, back.

Q Yes. I show you Exhibit 37. Now, will you explain about this verbal understanding? When was it entered into? *A* I testified that through error on the part of Mr. Barney or the witness, or both, no contract was made on or [*2157*] December 16, 1936, by which The Connecticut Power Company was guaranteed a supply of power for delivery to The Connecticut Light and Power Company at Bristol. I testified that we did obtain such power from The Hartford Electric Light Company. We did deliver and we were paid for it. That we operated under what you might term a verbal understanding or verbal contract.

Q Yes. Now, I want to understand what you mean by verbal

understanding or verbal contract? *A* I assume that a verbal understanding or verbal contract—

Q Well now, Mr. Colvin, I am not asking for any assumption. I want to know what you know about that verbal contract or verbal agreement? *A* The Connecticut Power Company rendered, received bills from The Hartford Electric Light Company, monthly bills, which were satisfactory to us, and in accordance with our understanding, and we paid them to The Hartford Electric Light Company.

Q In accordance with what understanding? *A* The understanding that is outlined in the formal agreement dated June 8, 1937.

Q But that understanding which is outlined in Exhibit 37 hadn't then been executed, had it? *A* It had not.

[*2158*] *Q* Then do you mean to say that the bills which were rendered prior to June 8, 1937, were rendered in accordance with the contract which was entered into after June 8, 1937? *A* My understanding is that the formal contract of June 8, 1937, is the reduction to writing of the agreement that had been in operation before that date and subsequent to January 1, 1937.

Q All right. Now, that agreement which had been in operation, you say, prior to June 8, 1937, what kind of an agreement was that? *A* That was an agreement under which the officers of The Connecticut Power Company understood that the requirements for the Bristol district of The Connecticut Light and Power Company were to be supplied by The Hartford Electric Light Company, and in fact were so supplied, and the price to be paid for them was based on a demand and energy charge, and the point of delivery from The Hartford Electric Light Company was specified, and The Connecticut Power Company was enabled to carry out its contract of December 16, 1936, with The Connecticut Light and Power Company.

Q Aside from the fact that the energy was received and that it was paid for on a certain basis, have you any knowledge of any agreement for the delivery or receipt of that energy on that basis?

A I have already testified that either through neglect [*2159*] on the part of Mr. Barney or myself, or both, that the contract of June 8, 1937, was not executed at or about the time the contract of December 16, 1936, covering the supply of energy by The Hartford Electric Light Company to The Connecticut Power Company for its other uses, was signed.

Q Yes. Now, what I want to get at is whether, when you speak of an understanding or a verbal agreement or a verbal contract, you have any knowledge of anything more than the fact that the energy was received and paid for. Now, can you just answer me that? Do you know anything else about any such agreement or contract other than that the energy was received and paid for? *A* I know that Mr. Barney stated that there should be a formal agreement covering the existing arrangement.

Q Now, do you know anything else besides that? *A* No, sir.

Q Then, as far as you know, there had been, prior to the receipt and payment for that energy, no meeting of the minds between the two companies as to whether it would be furnished, and what there should be paid for it?

Mr. Smith: I object to that question, as leading, and assuming a state of facts not in evidence.

Mr. Wahrenbrock: All right, I will withdraw it.

Trial Examiner: The question has been withdrawn.

The Trial Examiner would like to ask one question at [*2160*] this point.

You talk about an understanding. Who was that understanding between, Mr. Colvin, as representatives of the two companies?

The Witness: The understanding included Mr. Ferguson, Mr. Bird, Mr. Colvin, and through to the billing and paying departments of the respective companies.

Trial Examiner: When was that agreement reached?

The Witness: The agreement was a continuing one that had existed for many years, and I am sure that The Hartford Electric

Light Company always felt its understanding to supply power to the Bristol district of The Connecticut Light and Power Company.

Trial Examiner: As I understand you, there was no time at which representatives of the two companies sat down at the table, or met somewhere on the street, and said, "We will do this if you will do that?"

The Witness: The officers of the two companies, The Hartford Electric Light Company and The Connecticut Power Company are together several times a week, sir.

Trial Examiner: Well, did they come to any definite agreement as to this?

The Witness: It was not discussed until shortly before June 8, 1937, as a contract.

Trial Examiner: Counsel may proceed.

[*2161*] By Mr. Wahrenbrock: *Q* I direct your attention, Mr. Colvin, to the line from the Walcott Lane substation in Portland to pole 110, and specifically to that line as it existed from August 26, 1935, until June 30, 1939, and ask you how many taps there were on that line? *A* I know there were a group of ten or a dozen houses served from it. I don't know whether there was more than one tap on the line or not.

Q Isn't it a fact that they were served from a single transformer tap, a former tap from that line at that one point? *A* I told you I didn't know whether there was more than one tap or not.

Q Isn't the statement I made to you the statement made to me in your company when, in the presence of some other Commissioners, I was viewing those facilities? *A* Mr. Hippler talked with you when you were in the vicinity of pole 110. The discussion covered the service to a Mica Company that is there now, a manufacturing company, and covered the service to residential customers. I do not recall the point as to whether the 11,000 volt line was tapped at more than one point being asked or answered.

Q What was the phase of the line from Walcott Lane to pole 110? *A* Three-phase.

[*2162*] *Q* What was the phase served to the residential cus-

tomers that you have spoken of, the ten or a dozen of them that you speak of? *A* As far as I know single phase.

* * * * * * [*2164*]

Q Do you know whether any of those taps on the 13,800 volt line were in existence and connected after the date in the spring of 1936 when the New Britain interconnection of The Connecticut Power and The Connecticut Light and Power Company was discontinued? *A* I have no means of ascertaining specific dates without a search of the actual work orders that were done on those taps. I know personally that the so-called Pecauset tap, [*2165*] which was the first one, was in existence in the early 1930s and persisted until the highway was reconstructed in connection with the new Portland-Middletown bridge, which I would believe was in 1938 or 1939, because I passed that particular section in my travels.

Q Was that after the 1938 hurricane? *A* I cannot answer whether the line was damaged in the 1938 hurricane or not. Everything in general was.

Trial Examiner: I don't think the question, Mr. Colvin, was whether it was damaged. I understood the question was whether that was after the hurricane.

The Witness: I cannot relate it to the hurricane in September, 1938.

By Mr. Wahrenbrock: *Q* How are those residences or residential customers at those places served at present? *A* At the present time we have added on the poles in that section a lower voltage network or system which takes those customers and others that have since come on, and they are served from the feeder from the Walcott Lane substation at 4160 volts nominal pressure.

Q That is, the customers are served at 110 stepped down from 4600? *A* Our standard service is 110-220 volts, three wire nominal secondary voltage. This particular system is 4160 [*2166*] volts Y connected, which is 2300 volts from the neutral to the outside and 4160 volts between phase wires.

Q And those 4160 circuits have been added without removing the 13,800 volt lines? *A* The line still remains on the same poles. The transformers which formerly energized the lower voltage circuit have been removed.

Q Were all of the residential customers served from these transformers at these three taps to which you have referred, served at single phase? *A* As far as I know, all residential service is single phase, and is so stipulated in our rates.

Q In order to serve them at single phase, it was not necessary to have a three-phase, 13,800 volt circuit, was it? *A* They might have been served from any other circuit. A single phase circuit would have provided an adequate supply.

Q Two of the three phases were unnecessary to serve that—

Q One of the three wires was not necessary. It takes two wires to have a single phase circuit. It takes three wires to have a three-phase service.

Q One of the wires then was not necessary? *A* Was not necessary.

Q What was the approximate length of the line from pole 110 to East Hampton? [*2167*] *A* I do not know, sir. That was the property of The Connecticut Light and Power Company. An exhibit was shown me a week ago Monday, on which that line was indicated. A Government map.

Q Well, do you know from your own knowledge? *A* The highway does not follow the route of the pole line.

Q Well, don't you know approximately how far—whether it was a matter of one mile or five miles or ten miles? *A* Oh, a matter of ten or fifteen miles.

* * * * * * [*2174*]

HAROLD E. MILLER.

Direct Examination (Resumed) by Mr. WAHRENBROCK.

Trial Examiner: You will note the witness is being recalled for further testimony. He does not need to again be sworn.

Q You are Harold E. Miller, who had previously testified in this case? *A* I am.

Q I show you a copy of Exhibit 60 for Identification, and ask you if that was prepared under your direction. *A* It was.

Q On the basis of what data and information did you prepare that, or was that prepared? *A* I made up the rough sketch from which this was prepared, in the drafting room under my direction, from the report of The Connecticut Power Company's annual power system statement for the year 1940, and also in that report there is a copy of the one-line diagram which has since been identified, I believe, as Exhibit 38. This Exhibit 60 is in accordance with Exhibit 38 in so far as it shows the lines of The Connecticut Power Company and The Torrington Electric Light Company.

The Winsted substation shown is as it is, a one-line diagram based on certain sketches I made at the time I visited the Winsted substation, and I believe that covers the basis of the [*2175*] diagram.

Q What does the diagram represent? *A* The diagram represents in one-line form the lines of The Connecticut Power Company from Massachusetts to the South Meadow substation, along the C. P 1 and C. P. 2 lines to Falls Village. It shows the E-line running to the Central Hudson Gas and Electric Corporation. It shows the connection to The Hartford Electric Light Company at South Meadow. It shows the Middletown tap and the circuits at West Side substation at Middletown. It shows the Bristol substation of The Connecticut Light and Power Company. It shows the substation of the Thomaston division of The Connecticut Power Company. It shows the substation at Torrington of The Connecticut Power Company and The Torrington Electric Light Company.

In this connection I wish to state that there is no attempt made at Torrington to in any way indicate ownership changes. It also shows the substation at Torrington of The Connecticut Light and Power Company. It shows the Winsted substation of The Connecticut Light and Power Company. It shows the Robertsville plant of The Connecticut Light and Power Company.

It shows the Falls Village Plant and substation, and I believe I have covered most of the information contained on this one-line diagram.

[*2176*] *Q* Does the diagram purport to show, and does it show, all disconnections, metering points and appurtenant facilities to those you have described? *A* The diagram does not attempt to show the switching in general. There are a few switches that have been placed in the diagram where it was felt that it might be necessary in referring to this diagram to be able to point to those switches; but switches in general were left off because they would complicate the diagram, which was devised primarily to enable showing directly the connections between The Connecticut Power Company and other companies.

Q As of what period of time does the exhibit 60 represent the facilities which it purports to represent? *A* With respect to the lines from Massachusetts to South Meadow and the connections at South Meadow substation, and the CP 1 line and the Falls Village plant, it represents, in so far as I was able to determine, the situation for the period since the Federal Power Act, which was in August, 1935, became effective. With respect to the Middletown division it shows the West Side substation from the time that substation was put into effect. With respect to the Portland, there is a note on it that indicates a connection with The Connecticut Light and Power Company prior to July 1, 1939. [*2177*] With respect to Torrington it shows the condition at Torrington since the installation of the 15,000 k.v.a. three-phase transformers at Torrington. In respect to Winsted substation it represents the conditions existing at least at the time of my visit at Winsted, and from what I could determine at that point, for some period prior to that.

Q And what date was that? *A* That was in May of 1941 that I visited the Winsted substation.

* * * * * * * [*2178*]

Cross Examination by Mr. SMITH.

Q I believe your said, Mr. Miller, that the C-3 and D-4 lines

shown on Exhibit 60 were as they were on August 24, 1935, and from that time to date? *A* Did I say August 24th? I don't believe I did.

Q I thought you did. From what date did you say? *A* I did say that from the approximate time of the Act, when the Act went into effect. I did not specify that I understood there was a period of time between August, 1935 and some time in April, 1936, or thereabouts, or March, 1936, when that line was opened at the Massachusetts border.

Q Well, this exhibit as to the C-3 and the D-4, and the E line, does not attempt to show an addition to those lines during the time that they were cut, does it? *A* No, it doesn't.

Q Now, the D-4 line at the present time, and since March of this year, is not as it is shown on this Exhibit 60, is it? *A* No, I believe in my direct testimony I had clearly stated that the D-4, some time in March, 1941, had been [*2179*] changed from 66 k.v. operation to 110-115 k.v. operation. In discussing it now, I was briefly describing this thing—I thought that anything I had said previously would be considered as part of my explanation.

Q And you have also stated that few, if any, switches are shown on this exhibit? *A* That is correct.

Q Is it fair to say that this one-line diagram, with the exception of the Winsted substation, and the Bristol substation, is the same as Exhibit 38, but in much less detail, showing you Exhibit No. 38, the one-line diagram of The Connecticut Power Company? *A* I would not say it is the same. I think the arrangement of this diagram more clearly illustrates the lines showing connections with Massachusetts and with New York than can be obtained from Exhibit 38, without considerable study.

Q But Exhibit 38 does show the switches, does it not? *A* Exhibit 38 does show the switches.

Q And is more detailed as to such matters on the lines, such as switches, meters, and so forth, is that correct? *A* I have stated that Exhibit 38 does show the switches.

Q And is more detailed? *A* It is all a matter of what diagram is prepared for. The question of switching is not involved in making this diagram, but this diagram is prepared for the purpose of [*2180*] enabling someone to very quickly trace connections between The Connecticut Power Company from Massachusetts to South Meadow station along the CP1 and CP2 lines to Falls Village, and to the New York State line, and I think that serves that purpose much more clearly than Exhibit 38. Exhibit 38 shows many other connections of The Connecticut Power Company and CP1 and CP2 lines, and to that extent may be very confusing.

Q You mean, this was prepared not to show the facilities, but to show this set of facts? *A* It does show the facilities, but it shows them in a much more clear manner than the Exhibit 38 does.

Q Directing your attention to Exhibit 60, the West Side substation, 13.8 k.v. bus, you show one line going to Portland. There are others, aren't there, going off of that 13.8 k.v. bus? *A* I don't recall at the present moment whether there are others.

Mr. Wahrenbrock: I am sorry, Mr. Examiner, I can't hear.

Trial Examiner: Will both the witness and the respondent's counsel speak just a little louder. There is a good deal of noise outside which is competing with you. Will you repeat that question and answer for the benefit of Commission's counsel.

(Whereupon the last question and answer as above recorded, were read by the reporter.)

[*2181*] The Witness: I desire to amplify that statement by adding that you will note that a connection is shown there on the 13.8 k.v. bus, a line shown within the outline of the substation to Portland. No attempt is made to show the line crossing the river, or going to pole 110. It was felt for the purpose of this diagram that it was sufficient to show that from the West Side substation from the 13.8 k.v. bus, there was a circuit to Portland,

and to The Connecticut Light and Power Company, prior to July 1, 1936.

By Mr. Smith: Are there other circuits going out of that 13.8 k.v. bus? *A* I believe there is an alternate circuit that does go off through some special switching arrangement, that also goes to Portland, but I don't believe it comes directly from the bus, but through some special switching arrangement that might be quite confusing if an attempt is made to show them.

Q Are there any other circuits that run off this 13.8 k.v. bus shown at Middletown division and as shown here? *A* I believe there are, to The Connecticut Power Company's system.

Q Thank you. Will you now direct your attention to the substation at Bristol, and your attention to the 13.8 k.v. bus shown there. Are there any other feeders that run off that bus? *A* I haven't made any attempt to show feeders in any [*2182*] of the substations on this diagram. I was not— in making this diagram—attempting to show the distribution system of the companies in each one of the substations. In every case I have only shown the substation buses, and any connections between the company owning that substation and any other company. But I have not shown circuits going to various feeders of which there are probably a great many at Bristol, or any of the substations of The Connecticut Power Company.

At South Meadow I have only shown the high voltage circuit. I haven't shown all the circuits going off the 11 k.v. bus of The Hartford Electric Light Company. It wouldn't have added anything to the diagram. It would have made it confusing for the purpose for which this diagram was made.

[*2183*] *Q* So this is a one-line diagram then not of the system of any of the companies listed under the legend, but simply a one-line diagram showing only certain of the facilities? Is that correct? *A* This is a one-line diagram intended to show the correct connections of The Connecticut Power Company at the Massachusetts line and at the New York line and the connections with other companies and its connections with The Connecticut Light

and Power Company either directly or through other companies along the C.P. 1 and C.P. 2 lines, and I can't characterize it in any other way.

* * * * * * [*2190*]

RICHARD B. CURRAN,

a witness called on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Mr. Curran, will you please state your full name? *A.* Richard B. Curran.

Q Your business address? *A* 31 Union Street, New London, Connecticut.

Q And your home address? *A* 807 Ocean Avenue, New London, Connecticut.

Trial Examiner: Is that C-u-r-r-a-n?

The Witness: That is right, sir.

By Mr. Wahrenbrock: *Q* What position do you hold with The Connecticut Power Company? *A* Secretary and Treasurer.

Q How long have you held that position? *A* Since January or February, 1932.

Q 1932? [*2191*] *A* Yes.

Mr. Wahrenbrock: I show respondent's counsel two letters in the file I hand him marked by clip.

Mr. Branch: One a letter to the Power Commission and the other a copy of a letter from the Power Commission?

Mr. Wahrenbrock: That is right.

Mr. Branch: Have you copies of those?

Mr. Wahrenbrock: I do not. I propose to ask one or two questions about them.

By Mr. Wahrenbrock: *Q* Mr. Curran, I call your attention to a carbon copy in one of the files of the Federal Power Commission which bears the date June 28th, 1939, being a carbon copy of a letter addressed to The Connecticut Power Company, attention Mr. Allan D. Colvin, over the signature of Leon M. Fuquay, Secretary, and ask you if you recall receiving the original of which

that is a carbon copy, and in that connection, I call your attention to an original of a letter addressed to the Federal Power Commission under date of July 11th, 1939, on the letterhead of The Connecticut Power Company, and signed "The Connecticut Power Company, R. B. Curran, Secretary and Treasurer".

With reference to the last letter, I ask you if that is your signature. *A* Yes, sir.

Q Do you recognize both of the letters? [*2192*] *A* I think I do.

Q Did you receive the letter under date of June 28th from the Federal Power Commission? *A* I think it was received in the office while Mr. Colvin was away.

Q And referred to you for attention? *A* Yes.

Q And the letter of July 11th, 1939 is the letter which you prepared and sent in reply thereto? *A* Yes, that I prepared, based on information supplied to me, I think, by Mr. Ferguson, the president of the Company.

Q I call your attention to the fourth paragraph of Mr. Fuquay's letter of June 28th—

Mr. Branch: May I look on with you?

Mr Wahrenbrock: Yes, indeed.

By Mr. Wahrenbrock: *Q* Which reads as follows:

> "4. Indicate periods in the year 1938 when operating and water conditions at the Falls Village plant made it necessary to supply The Connecticut Light and Power Company at Bristol with energy received by your company from The Hartford Electric Light Company and from Turners Falls Power Company through the Connecticut Valley Exchange."

And I ask you to read the reply which you made to that paragraph 4.

[*2193*] Mr. Branch: I object to this. I don't think this is the proper way to put in evidence, reading a letter that this gentleman wrote to the Federal Power Commission.

Trial Examiner: It seems to me that it may be admissible for showing his statement at the time.

Mr. Branch: I don't see that his statement at the time is material. Can I put in any letter that anybody writes to the Federal Power Commission, as evidence of the facts, or anything else? It seems to me that violates one of the fundamental rules of evidence.

Trial Examiner: The witness is being asked whether he made certain statements. I think he may properly be asked whether he made certain statements. They are his own statements they are not somebody else's.

Mr. Branch: Well, sir, I think he said "on information supplied to him." It doesn't appear that he had any first-hand knowledge of the situation.

Trial Examiner: Apparently he made a statement. That is all he is being asked,—what the statement was that he made.

Mr. Branch: Yes, sir. But it seems to me—

Trial Examiner: It seems to me the question of the sources of his information can be explored on cross-examination.

Mr. Branch: Yes, sir.

Trial Examiner: The witness is here, and subject to the right of cross-examination. It is not a matter of a letter being [*2194*] introduced in his absence.

Mr. Branch: No, sir; but in my experience I never heard of a letter which wasn't addressed to us being put into evidence, a letter between two other parties.

Trial Examiner: I don't think this is being introduced for the purpose of showing any statement.

Mr. Branch: I don't think it is material, sir, what statement he made, otherwise we could put any witness on the stand and say "Did you say to John Smith this thing yesterday"? "Yes". Then it is in evidence. That seems to me just—

Trial Examiner: The witness is an officer of the company from whom your client was obtaining power, with whom they had

physical and contractual relations. It seems to me that the question of the statements made at the time may well be relevant.

Mr. Branch: Well, if that is your view, I wish to persist in my objection, but I won't argue it further, sir.

Trial Examiner: The objection is overruled and an exception will be noted.

Mr. Wahrenbrock: May the reporter read the question for the benefit of the witness?

Trial Examiner: The question will be read back to the witness.

(The question is read by the reporter.)

A "It was never necessary to use power from Turners Falls [*2195*] for Bristol in 1938.

"In practice, Bristol is usually served with commingled energy generated at Falls Village."

Mr. Branch: Can you speak a little louder?

The Witness: (Continuing) "Hartford and Turners Falls, in varying amounts, according to conditions, rather than to pond at Falls Village for Bristol requirements. In every month the energy put on the line from Falls Village and Hartford was greater than the Bristol requirements."

[*2196*] By Mr. Wahrenbrock: *Q* I will now read to you from Mr. Fuquay's letter of June 28th, the request numbered 6 therein, and ask you what reply you made to that request:

"6. If there were any operating factors or equipment, or arrangement which prevented in 1938, the energy received by your system from Massachusetts on the 66 k.v. bus at South Meadow substation from reaching the interconnections at points 'C' and 'D,' and being delivered to The Connecticut Light and Power Company, please set forth in detail such condition."

Will you state what answer you made to that inquiry?

Mr. Branch: The same objection.

Trial Examiner: The objection is overruled. An exception will be noted.

The Witness: "No such factors or equipment in 1938. The load dispatcher is responsible for seeing the 66 k.v. bus at South Meadow is always energized by Hartford or Falls Village. That is, that there shall be on the line at all times either exclusive Connecticut generated energy, or commingled Connecticut and Massachusetts energy; never Massachusetts generated energy alone."

Mr. Wahrenbrock: Do you care to refer to that further, Mr. Branch?

Mr. Branch: Have you finished your examination of the witness?

[*2197*] Mr. Wahrenbrock: I think so.

Mr. Branch: Yes, I would like to refer to it during the cross-examination.

Mr. Wahrenbrock: Just a minute. I have no further direct examination, Mr. Examiner. I show the letters referred to to Mr. Branch.

Trial Examiner: The witness is yours for cross-examination, Mr. Branch.

Mr. Branch: Yes, sir. May I stand by the witness to ask him?

Trial Examiner: You may.

Cross Examination by Mr. BRANCH.

Q I call your attention to this letter, and ask you whether question 5 was as follows/ in the letter from Leon M. Fuquay, secretary of the Federal Power Commission, to the Connecticut Power Company, Attention of Mr. Colvin—

Mr. Wahrenbrock: Without making a formal objection—

Mr. Branch: May I not finish? I didn't interrupt you.

Trial Examiner: Permit counsel to finish the question before the objection is made.

By Mr. Branch: *Q* I call your attention to this copy of the letter from Leon M. Fuquay to The Connecticut Power Company,

addressed to the attention of Mr. Allan D. Colvin, executive vice-president [*2198*] dated June 28, 1939, and ask you whether the paragraph numbered 5 reads as follows:

> "Give if possible an estimate of the amount of Massachusetts energy delivered by your system to The Connecticut Light and Power Company at Bristol."

And I ask you whether you answered that in the following language, under the heading Item 5 in your letter of July 11, 1939, to the Federal Power Commission:

> "No estimate is possible. It is not possible to identify power delivered at any particular point as being generated at any particular place when power from several sources is commingled on a transmission system. None was necessary."

Was that your answer? *A* Yes, sir.

Q And was that your best information at that time? *A* That was the best information that I received, yes, sir.

Mr. Branch: Have you the map that is referred to here, referring to points E, F and G?

Mr. Wahrenbrock: I will have to examine it for a moment and see. That is form 64, for the period 1938.

Mr. Branch: Will you be looking that up, or ask your assistant to do it, while I glance through the letter?

Mr. Wahrenbock: I will be glad to.

[*2199*] By Mr. Branch: *Q* I direct your attention to a sheet which is apparently attached to the letter of July 11, 1939, from you to the Federal Power Commission, under the heading, "Column 1", and direct your attention to the last column, "266 k.v. interconnected section, point F", and that aggregate 89,598,000 kilowatt hours. According to your best information, was that the amount of energy which you regarded as received by your company from The Hartford Electric Light Company that month, which was delivered at that point? *A* I don't know what point

"F" refers to, and I am quite sure this information was supplied to me by the engineering or statistical departments, so I am not too familiar with the figures that are in there.

Q All right, never mind. Is it true then that you yourself had no knowledge of any of these matters? *A* I might answer that by saying that I attempted to have the letter answered for Mr. Colvin in his absence, and received the information, I believe, from Mr. Ferguson to write the letter.

* * * * * * [*2201*]

Q Mr. Curran, I call your attention to the copy of the letter from the secretary of the Federal Power Commission to The Connecticut Power Company, June 28th, 1939, and ask you whether the first part reads as follows:

> "In connection with a study now being conducted by the Federal Power Commission concerning the origin and flow of the energy delivered by your company to The Connecticut Light and Power Company near Bristol, Connecticut, you are requested to submit the following:"

Is that the way that letter begins? *A* Yes, sir.

Q I call your attention to your answer, to Item 4, which apparently is in answer to this paragraph of the letter from the Secretary of the Federal Power Commission to your company:

> "Indicate periods in the year 1938 when operating and water conditions at the Falls Village plant made it necessary to supply the Connecticut Light and Power Company at Bristol with energy received by your Company from the Hartford Electric Light Company and from Turners Falls Power Company, through the Connecticut Valley Exchange."

Did you answer that as follows:

> "It was never necessary to use power from Turners Falls for Bristol in 1938."

[*2202*] Is that the first sentence of your reply to that? *A* Yes.

Q And then the sentence that Mr. Wahrenbrock read headed "In practice" and so forth? *A* Yes.

Q And then this sentence, which I think was not read:

> "In every month the energy put on the line from Falls Village and Hartford was greater than the Bristol requirements."

Was that your reply? *A* It was.

* * * * * *

Q Did you make the following statement in your letter to Mr. Fuquay, the secretary of the Federal Power Commission, [*2203*] dated July 11, 1939:

> "The load dispatcher is responsible for seeing that the 66 k. v. bus at South Meadow is always energized by Hartford or Falls Village, *i.e.*, that there shall be on the lines at all times either exclusively Connecticut-generated energy or commingled Connecticut and Massachusettts energy, never Massachusetts-generated energy alone."

Did you make that statement? *A* May I ask if you read this line here, Mr. Branch?

* * * * * *

By Mr. Branch: *Q* Did you make that statement, in answer to an inquiry [*2204*] in the paragraph numbered 6 of Mr. Fuquay's letter to The Connecticut Power Company? *A* I did, in reply to the letter dated June 28th, 1939.

Q And was that—

Trial Examiner: Will the witness speak just a little louder?

The Witness: I am sorry. I did, in reply to the letter dated June 28th, I believe it is, 1939.

By Mr. Branch: *Q* And is that in accordance with your understanding of the facts? *A* It is in accordance with what was furnished me as the facts by Mr. Ferguson, as president of the Company.

Q Now, in order that there be no contention that I have tried to conceal anything, I will ask you this:

Was there another sentence above that in answer to Item 6: "No such factors or equipment in 1938"? *A* There was.

Q And that was a reply to the following, in Mr. Fuquay's letter to you reading as follows:

> "If there were any operating factors or equipment or arrangement which prevented in 1938 the energy received by your system from Massachusetts on the 66 k. v. bus at South Meadow substation from reaching the interconnections at Points C and D [*2205*] and being delivered to the Connecticut Light and Power Company, please set forth in detail such conditions."

Is that a correct statement? *A* That is right.

Q And the longer sentence beginning "The load dispatcher" was also written in answer to that suggestion or inquiry, was it not? *A* It was.

Q Did you make any investigation to determine whether or not "in practice Bristol was usually served with commingled energy generated at Falls Village, Hartford and Turners Falls in varying amounts, according to conditions, rather than to pond at Falls Village for Bristol requirements"? *A* I did not.

* * * * * * [*2208*]

AUSTIN D. BARNEY,

previously sworn, resumed his testimony:

Cross Examination (*resumed*) *by* Mr. BRANCH.

* * * * * * [*2214*]

Mr. Branch: We may be able to shorten this matter if counsel for the Commission would indicate to us his contention as to the duration of the emergency. He has stated that he makes no contention that what was done during the emergency would [*2215*] be material, or that they would base no claim on it, but he has not indicated what he regards as the extent of the emergency.

May I ask that of counsel? I believe some statement was made on that. Will you amplify that?

Mr. Wahrenbrock: Mr. Examiner, the matter is of little moment, I think, and I would be glad to do what I can to clear it up. It is already in the record, the period of time on which the witness Miller's studies of flows were made, and the period of time during which those flows occurred. They began January 1, 1937 at the earliest. I think there is no contention that that covers the emergency period at all, so I don't see why he wants to argue the emergency period at all in this case.

* * * * * * [*2218*]

Mr. Wahrenbrock: Mr. Examiner, I wish to clarify one thing. We have been discussing here the period of the emergency and the period with respect to which Mr. Miller's studies relate. I want to make it perfectly clear that nothing I have said relates to the Groton situation, with respect to the period of time that is involved.

Trial Examiner: It will be so understood. I don't think there is any intention to consider this witness's testimony in connection with Groton at all.

* * * * * * [*2227*]

Redirect Examination by Mr. WAHRENBROCK.

* * * * * * [*2231*]

By Mr. Wahrenbrock: *Q* Without reading again the question and answer, I will ask you whether by the answer you made you intended to imply that under Exhibit 39, out of State energy might not be supplied? *A* No, I didn't meant to imply any such thing under the exhibit. Exhibit No. 39 only goes to exchanges of energy between the parties thereto, and has no relationship so far as I know, never has had, to what any of the parties do with the energy thereafter. There is nothing in that exhibit that has any relationship to any supply of energy by the separate company thereto.

Q Do you mean to say that under Exhibit No. 39, electric energy is not supplied which is utilized by the companies which receive it, to satisfy the requirements laid on them by the contracts of The Connecticut Power Company with The Torrington Electric Light Company and The Connecticut Power Company at Bristol?

Mr. Branch: Excuse me. The train prevented my hearing the first part of the question. May I have it read?

Trial Examiner: The reporter will read the question for [*2232*] the benefit of respondent's counsel.

(Whereupon the last question as above recorded, was read by the reporter.)

Mr. Branch: I object to that question. I think Exhibit 39 speaks for itself, and this kind of a question is not proper to ask one's own witness.

Trial Examiner: It seems to me the question is in order. The objection is overruled and exception will be noted for the respondent.

The Witness: That is in essence an engineering question. I can't say just what The Connecticut Power Company does with the energy they may receive from the Exchange. I know as a layman that it must be utilized some way. Now, that is as far as I can go.

[*2233*] *Q* I will ask you this question, if I may, Mr. Barney: Why, when Mr. Branch asked you whether there had been any contract arrangement or understanding providing that any energy originating outside of the State of Connecticut be delivered either to The Torrington Electric Light Company or to The Connecticut Light and Power Company by The Connecticut Power Company, did you limit your response to agreements between The Connecticut Power Company and The Connecticut Light and Power Company? *A* Well, getting into the question of contractual relationships, I limited my answer in that case because I don't know of any contract between the companies that call for or in any way provide for a source of energy outside the State.

Q You did know of Exhibit 39, didn't you? *A* Yes, but as I have stated before, Exhibit 39 has no relationship to those contracts which, as far as I have been able to read them or understand them, are firm power contracts for firm capacity all located in the State of Connecticut.

Mr. Wahrenbrock: Well, I don't think I need argue the contents of an exhibit which is in the record.

No further direct and no further redirect, Mr. Examiner.

Mr. Branch: Just one or two questions, Mr. Barney.

Trial Examiner: This is in re-cross?

Mr. Branch: Yes, sir.

Recross Examination by Mr. BRANCH. [*2234*]

Q Do you know of any contract arrangement or understanding that has been in effect at any time since August 25, 1936 which provides—I should say August 26th, 1935—which provides that any energy originating outside of the State of Connecticut be delivered either to The Torrington Electric Light Company or to The Connecticut Light and Power Company by The Connecticut Power Company? *A* I think my answer is "No" but that was rather an involved question. I don't know of any contracts between The Connecticut Power Company, contract or arrangement, and any other company outside of the State, that calls for within its terms, or in any way provides the source of power under the terms of such an arrangement, for delivery of such power to The Connecticut Light and Power Company at Bristol or to The Torrington Electric Company. In other words, any contract that is an underwriting contract, similar to the contract between The Connecticut Power Company and The Hartford Electric Light Company for the supply of power to The Connecticut Power Company, covering its obligations at Bristol to The Connecticut Light and Power Company. The only arrangement I know of concerning energy outside of the State is the Connecticut Valley Power Exchange arrangement, exhibit 39.

Q And would the answer be the same answer applied to the

[2235] supply of The Connecticut Light and Power Company at the East Hampton District? *A* Yes, the same answer would apply.

* * * * * * [2245]

H. D. LARRABEE,

a witness called in behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Will you state your name for the record, please? *A* H. D. Larrabee.

Q And your business address? *A* 1270 Main Street, Willimantic, Connecticut.

Q I beg your pardon? *A* 1270 Main Street, Willimantic, Connecticut.

Q And your home address? *A* Wyndham Centre, Connecticut.

[2246] *Q* What is your position with the Connecticut Light and Power Company? *A* I am manager of its Eastern Division.

Q How long have you held that position? *A* Since it was formed in 1937.

Q 1927? *A* '37.

Q How long prior to that time had you been employed by The Connecticut Light and Power Company, or a predecessor company of that company? *A* Since August 1st, 1919.

Mr. Wahrenbrock: I direct the respondent's counsel's attention to the memorandum "Re Borough of Groton," dated September 6th, 1935, photostatic copies of which they have furnished me, and I believe have retained photostatic copies, and hand one copy to the reporter and one to the Examiner, and ask that the memorandum be marked for identification as Exhibit Number 75.

Trial Examiner: It will be so marked.

(Document referred to was marked Exhibit Number 75 for Identification.)

By Mr. Wahrenbrock: *Q* I show the witness Exhibit Number

75 for Identification, and ask him if he can tell us what the memorandum was of which Exhibit 75 for Identification is a photostatic copy? *A* That is a memorandum explaining the general set-up [*2247*] of lines and facilities in the neighborhood of the Borough of Groton.

Q Was the original of that memorandum prepared and signed by you? *A* Yes, I believe so.

[*2248*] *Q* And to whom was it submitted? *A* I don't know.

Q About what time was it prepared by you? *A* Why, I presume about the time of its date, September 6, 1935.

Q I direct your attention to the sketch which is attached and ask you if that was attached to the original memorandum? *A* I think it must have been. It was prepared in connection with a memorandum.

Q Was that prepared by you or under your direction? *A* Under my direction, yes.

Q I direct your attention to the fourth paragraph of the memorandum, which reads as follows:

> "At Trails Corner we own the land upon which the transmission line and transformers are erected and, also the lines, transformers, and metering equipment."

Trial Examiner: Does the witness have the question?

The Witness: Yes.

By Mr. Wahrenbrock: I asked you if you will explain, Mr. Larrabee, what the transmission lines referred to were? *A* The lines shown on the sketch.

Q That is, it was a portion of the 33,000 volt line of the Connecticut Light and Power Company from Montville to Trails Corner substation, and from thence to the Groton-Long [*2249*] Point outdoor substation ? *A* More correctly, I think, it is the line from Hallville, a line from Hallville to the points shown on this map.

Q And by points shown on this map, you mean Trails Corner substation and Groton-Long Point outdoor substation? *A* Yes.

Q What does the legend near the top of the sketch on the transmission line, "To Montville station", mean? *A* The line is connected to the Montville station and gets its energy from the Montville station.

Q And is—or up until about March, some time in February of this year, was that energy which was received from the Montville station, was some of that energy which was received from the Montville station delivered to Fishers Island?

Mr. Branch: I think the question is by whom. I think it ought to be—

Mr. Wahrenbrock: I am not asking by whom. I am asking if energy was delivered.

Trial Examiner: I think the question is relevant. If it is desired to be further brought out, it may be brought out by counsel on either side afterwards.

By Mr. Wahrenbrock: *Q* Do you have the question in mind? *A* Yes. We did not deliver it, no.

Q That wasn't my question. My question was whether [*2250*] some of that energy was delivered to Fishers Island? *A* I don't know that I could properly say, since it goes beyond the end of our facilities.

Q But your knowledge isn't limited to the scope of the facilities in your company, is it? *A* Pretty much.

Q Well, you know some things beyond the scope of the facilities of your company? *A* Yes.

Q Actually, as a matter of fact, in this memorandum you stated where that energy went, didn't you? *A* I stated on the second page that the 6600 volt circuit mentioned supplied the submarine cables and the Borough of Groton-Long Point substation.

Q What did you mean by supplying the submarine cables? *A* That the 6600 volt circuit was connected to the submarine cable.

Q And where did the submarine cable lead? *A* Fishers Island.

Q And where did they take the energy to? *A* They take it where it went. The cable went to Fishers Island and were con-

nected to the 6600 volt line, that little substation shown down at the point.

Q Yes. Now, that submarine cable and the lines to which it was attached supplied some of the energy which The Connecticut [*2251*] Light and Power Company took to the Borough of Groton and to the Groton-Long Point—supplied some of that energy to the Fishers Island, didn't it?

Mr. Branch: May I have the question read, please?

Trial Examiner: The reporter will read the question for the benefit of counsel for the respondent.

(Whereupon the last question as above reported, was read by the reporter.)

Mr. Branch: I object to it on the ground there are several assumptions there. I don't object to a question designed to bring out what I think he is driving at, but I object to the question in that form.

[*2252*] Trial Examiner: I don't know whether the question was in very good form. Counsel seems to have made a slight error and at one point corrected it in the question, if I understand it correctly.

Mr. Wahrenbrock: May the reporter not go away until we get this question settled, please?

Trial Examiner: It might be well if the question were reframed, if the witness has any question as to what it means.

By Mr. Wahrenbrock: *Q* Was some of the electric energy which The Connecticut Light and Power Company supplied to Trails Corner and to Groton-Long Point substation, carried by the submarine cables to Fishers Island? *A* Yes.

Q And was it consumed at points on Fishers Island? *A* I couldn't say. I don't know. Presumably it was. I never have been on Fishers Island.

Q That was the purpose for taking it to Fishers Island, wasn't it? *A* I presume so, certainly.

Q I direct your attention to the seventh paragraph of this memorandum, Exhibit 75 for Identification, which reads:

"The Borough of Groton pays us an 11 per cent annual investment charge on $30,210.12, covering the transformers and substation equipment which we own at Trails Corner and at Groton- [*2253*] Long Point substation and also our investment in the second transmission circuit from the chicken farm to the Groton-Long Point substation",

and I ask you whether the statements made in that paragraph were correct, to the best of your knowledge and belief? *A* Yes, to the best of my knowledge and belief.

Q I will refer now to the next paragraph, the second sentence of the next paragraph:

"Due to uncertainties which at that time existed (referring to October 31, 1933) in regard to the use of the transmission lines beyond Trails Corner, it was not possible to promptly comply with this request",

and I ask you what the transmission lines beyond Trails Corner were, to which you referred? *A* It was that part of the 33,000 volt line which for some time previously had been used to supply energy to the Groton Iron Works and the Atlantic Coast Fisheries, and there was the uncertainty referred to there, the uncertainty as to whether or not an industry would revive at that point.

Mr. Wahrenbrock: Will the reporter read me the last part of that answer? I missed part of it.

Trial Examiner: The reporter will read the answer back for the benefit of Commission counsel.

(The answer is read by the reporter.)

By Mr. Wahrenbrock: *Q* Now, I direct your attention to the last sentence of [*2254*] that same paragraph:

"Since June 11, 1935, therefore, we have had two delivery points as before; one at the low tension terminals of the transformers at Trails Corner, and the other at the terminals of our transmission lines at the Groton-Long Point substation, with a single metering point at 33 k. v. at Trails Corner."

And I ask you what "transmission lines" to which you referred there, referred to? *A* That is the two 33 k. v. circuits on one pole line indicated diagrammatically on this sketch.

Q Mr. Larrabee, what was the purpose of the preparation of this memorandum? *A* I am not sure.

Q Have you any recollection about it? *A* I can't be sure. Somebody must have asked me what the situation was and I attempted to explain it.

Q What is your best recollection as to who that somebody was?

Mr. Branch: Well, I object to that. He says he doesn't know, and I don't think that he should be requested to go any further.

Mr. Wahrenbrock: I think I am entitled to inquire and find the extent of his recollection without interference, Mr. Examiner?

Mr. Branch: Well, I object to the question on the ground [2255] I have stated, which seems to me to be sound.

Trial Examiner: I think that he may pursue the question to the extent of his recollection. The witness may answer if he has any recollection in the matter.

Mr. Wahrenbrock: May the question be read to the witness now?

The Witness: I know what the question is.

Trial Examiner: If the witness has no recollection, he can say so.

Mr. Wahrenbrock: And may the question be read to the witness?

Trial Examiner: The question will be read to the witness.

(Question read by the reporter.)

A I think it must have been Mr. Perkins, who was at that time vice president, executive officer in charge of the Eastern Division.

By Mr. Wahrenbrock: *Q* Did you report to or were you responsible to Mr. Perkins at that time, directly? *A* Yes.

Q Do you recall what the occasion was for his making an inquiry of you? *A* I am afraid I couldn't be sure at all about that.

By Mr. Wahrenbrock: *Q* Well, what is your best recollection in that connection? *A* Rather poor, because there had so many

different things [*2256*] come up in regard to investment and equipment down there, and other matters, in relation to our supply to the Borough, it would be difficult to pick out any one thing.

[*2257*] *Q* Do you have any notes or diary or journal with you to which you can refer to refresh your recollection of these matters? *A* I have a book.

Q Can you by referring to that book refresh your recollection as to the occasion or the circumstances for your making this report or this memorandum? *A* I don't know that that helps much. There had been this question of the single metering point, among other things, brought up. The question of the extent of our ownership of facilities may have been some such thing as that.

Q I show you Exhibit 66, and ask you if, by referring to that exhibit, you can refresh your recollection as to the circumstances under which your memorandum of September 6th was requested, or prepared? *A* This would indicate perhaps that Mr. Perkins had had some discussion in regard to our delivery points. But since Mr. Perkins and I were in the same office at Norwich, it wasn't naturally customary for us to write memoranda to each other, so that any request he might have made was likely to have been verbal, and that is my reason perhaps for not being able to remember.

Q What was the district in which you were employed at that time, in September of 1935? *A* Well, the same general location that I am in now, [*2258*] except the office was at Norwich instead of Willimantic.

Q What parts of the State did that district include at that time? *A* That included the territory which we served in the eastern section of the State, starting from the Massachusetts line in the town of Thompson, and I think Woodstock, extending south.

Q I show you Exhibit 71, and ask you whether—

Trial Examiner: Is that Exhibit 71 or 71 for Identification?

Mr. Wahrenbrock: I am not sure at the moment. At any rate, Exhibit 71 for Identification will make it sure what I mean.

By Mr. Wahrenbrock: *Q* And ask you whether the district to

which you refer is substantially the shaded area at the right-hand side of the map? *A* Yes, it is.

Q And were you at that time generally familiar with the operations of the company throughout that district? *A* Yes.

Q Were you familiar with the steps taken by the company in 1935, to disconnect its State line, its lines across or near State lines up in the northeastern corner of the State?

Mr. Branch: I object to it as immaterial.

Trial Examiner: Is it established that this was subsequent to the period of the effective date of the Federal Power [*2259*] Act?

Mr. Wahrenbrock: No, sir.

Trial Examiner: It doesn't seem to me that the question is material.

Mr. Wahrenbrock: I am laying a basis, Mr. Examiner, for further questions.

Trial Examiner: What is the purpose of those further questions, before you go further?

Mr. Wahrenbrock: If the point is to be argued, may it be argued in the absence of the witness, please?

Trial Examiner: All right, if the witness will withdraw from the room until he is called.

(Witness temporarily withdrew from the room at this point.)

Mr. Wahrenbrock: Mr. Examiner, I wish to ascertain whether the memorandum which has been referred to and which was prepared by the witness was prepared by him in connection with a line of consideration by the Company or the Company's officials as to whether the Fishers Island connection would subject them to the jurisdiction of the Federal Power Commission if the Bill which was then pending, or the Act, when it had been enacted, the Federal Power Act, should be enacted. I propose to show that the Company had full knowledge of all the facts upon which jurisdiction of the Commission vested after the enactment of the Act.

Mr. Branch: Well, sir, I don't quite understand your [*2260*] position. I think that I have stated that we had full knowledge of

the situation in respect to Fishers Island and there is no need in going into that. I don't see how anything that is suggested now could do anything more than establish that fact.

Trial Examiner: It doesn't seem to me that the proof of the question as to what happened before August, 1935,—it doesn't seem to me to be material to a memorandum dated after that date. The date of the memorandum is established and is within the period of the Act and why should it be necessary to bring in matters which are irrelevant, in order to prove the date of a memorandum which has a date upon it within the Act?

Mr. Wahrenbrock: Mr. Examiner, this is some time back. I expect to refresh the witness's recollection with the efforts which were then being made, in order to ascertain whether this memorandum which he has thus far been unable to recall the occasion for making, was prepared by him in the course of the company's general efforts to cut lines which would subject it to the Commission's jurisdiction, and that the Company, knowing that these were transmission facilities, which it owned, and knowing that the energy transmitted over them went out of the State, nevertheless chose to remain the owner and the operator of those facilities and to take its chances on the Federal Power Commission's jurisdiction.

[*2261*] Trial Examiner: You can do that without going into anything that happened prior to the effective date of the Act. It seems to me if we start into material prior to the effective date of the Act we are going to get a lot of irrelevant matter into the record. What they did prior to the effective date of the Act is absolutely irrelevant.

Mr. Wahrenbrock: Mr. Examiner, men's minds don't just cut off at a stonewall on August 25 in order to establish their recollection of what happened on and after that date. You have got to go back and explore the events which led up to it.

Trial Examiner: Well, if counsel could word his question in such a way as to inquire as to whether there was anything prior to 1935, which had to do with this memorandum, that might raise

another question. I might ask what the particular purposes of showing the reasons for the memorandum are.

Mr. Wahrenbrock: To show the Company's knowledge that some of the energy which it delivered to the Borough of Groton was to its knowledge energy which was being delivered to Fishers Island and consumed on Fishers Island.

Trial Examiner: I understand counsel to say that the Company admitted that they knew that. Is that correct?

Mr. Branch: We know the facts there. I don't know whether I would put it precisely that way, about the energy, but we knew the connections and the fact that that was the only [*2262*] source of supply there to Fishers Island.

Trial Examiner: Well, does counsel admit that they knew that energy was being transmitted to Fishers Island?

Mr. Branch: Why, yes.

Mr. Wahrenbrock: But there is still the further point then it was a part of the energy which the respondent was delivering to the Borough of Groton which reached Fishers Island, and I propose to show that.

Trial Examiner: I think that is also admitted, is it not?

Mr. Branch: Yes. There might be some question as to whether you want to characterize it as "the energy" but there was no other source for that supply for Fishers Island.

Mr. Wahrenbrock: That is just the point that there might be some question that they might want to argue in their briefs, and in the absence of an adequate record, they might be able to. For that reason I wish to settle the question, if I can, by testimony by this and other witnesses.

Trial Examiner: It seems to be that we would be spending a lot of time on a very small matter, in view of this admission.

Mr. Wahrenbrock: If the Examiner please, a lot of time has been spent in the Hartford case on no larger matters.

Trial Examiner: Well, that fact is not relevant to the issue in this case.

[*2263*] Mr. Wahrenbrock: Besides the point that I have made,

Mr. Examiner, I propose to show further that the Company knew and treated the facilities as being transmission facilities, which is another question that is not such a small matter.

Mr. Branch: That matter has already been covered.

Mr. Wahrenbrock: I can well understand why respondents don't want it to be covered any more thoroughly than it has already.

Trial Examiner: It seems to me that if the respondents admit that these are transmission facilities, and admit that the energy was transmitted to Fishers Island, and that they knew it, I can see no advantage in proceeding in this matter as to what happened in Eastern Connecticut prior to August, 1935.

Mr. Wahrenbrock: If the Examiner please, his statement of what the respondent's counsel admit is broader than respondent's counsels' statement of what they admit.

Trial Examiner: I would like to have Commission's counsel reduce the statement of what they propose to prove to the shortest possible compass. It seems to me there is a little doubt on just what you do propose to prove. Will you make a further statement on that, to clarify it?

Mr. Wahrenbrock: Mr. Examiner, I will make that statement. I am going to preface the statement that I am going to make by the fact that until Mr. Larrabee came to the stand [*2264*] I didn't know who Mr. Larrabee was, except by his position in the Company. I hadn't talked to him about the evidence he was going to put on, so I don't know what his answers are going to be, but I expect to be able—I hope to be able to show by Mr. Larrabee that the Company knew in 1935, about the time what is now the Federal Power Act was under consideration by Congress, that its facilities leading to the Borough of Groton, and the Groton-Long Point substation were transmission facilities; that those facilities were facilities for the transmission of electric energy, part of which was transmitted to Fishers Island and consumed on Fishers Island.

[*2265*] Trial Examiner: Does Commission's counsel in doing that propose to enter into the question of the cutting of any line—

any of the Massachusetts lines? It seems to me that that question was the immaterial question which raised this argument originally.

Mr. Wahrenbrock: I was asking that question in order to refresh the witness's recollection with respect to the efforts which the company was then generally making to cut all of its interstate connections in order to introduce that subject to his recollection.

Trial Examiner: You referred, however, to the period which was not the date of this memorandum.

Mr. Wahrenbrock: I referred to the date immediately prior to the enactment of the Act. I asked about the year 1935, if I recall correctly.

Trial Examiner: It seems perfectly absurd to ask if the memorandum was related in any way to the question of the transfer of facilities in connection with the beginning of the operations of the Act, without going into the question of the cutting of these lines.

Mr. Wahrenbrock: Very well.

Trial Examiner: It seems to me an immaterial question.

Mr. Davis: Shall I summons Mr. Larrabee?

Trial Examiner: Yes, unless respondent's counsel had something further to say.

[*2266*] Mr. Branch: I approved of your ruling on that question.

(Witness returns to courtroom.)

By Mr. Wahrenbrock: *Q* Mr. Larrabee, do you recall whether the memorandum which has been marked for identification as Exhibit 75 may have been prepared by you in connection with a consideration of the problem of the company's disconnection of its interstate interconnections? *A* It might well have.

Q I will ask you whether in making the references—I withdraw that question, please. I direct your attention to Exhibit 66, which I believe is before you there. Do you recognize it? *A* Yes.

Trial Examiner: Memorandum dated June 21st or 24th, I can't be sure, 1935, to R. H. Knowlton.

The Witness: I have it.

By Mr. Wahrenbrock: *Q* And I refer to the next to the last line of the first paragraph, where there is a reference to the

33,000 volt transmission line at Groton-Long Point, and the last sentence of the second paragraph where there is a reference to the same 33,000 volt transmission line, and ask you whether it was the common practice among officials and employees of the company in 1935 to refer to the 33,000 volt line to the Borough of Groton and [2267] to the Groton-Long Point substation, as a transmission line? *A* I would think that we did refer to it as a transmission line, without any particular regard to its classification.

Q Were you ever criticised or instructed not to refer to it as a transmission line? *A* Not that I know of.

Q I didn't hear you? *A* Not that I know of.

Q Not that you know of? *A* No.

* * * * * * [2279]

ADRIAN V. S. LINDSLEY,

a witness called in behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Will you please state your full name for the record? *A* Adrian V. S. Lindsley.

Trial Examiner: Speak just a little louder so that everybody can get it.

By Mr. Wahrenbrock: *Q* Your business address, please? *A* 250 Freight Street, Waterbury.

Q And your home address? *A* 424 Main Street, Watertown.

Q What position do you hold with The Connecticut Light and Power Company? *A* That of a vice president.

Q How long have you held that position? *A* Approximately two and a half years.

Q How long prior to that time were you with The Connecticut Light and Power Company or its predecessor company? *A* Since October, 1919.

Q Do you have Exhibit 76 for Identification on the desk before you?

[2280] *Q* Did you sign the original of which that is a copy? *A* I did.

* * * * * * [2295]

Cross Examination by Mr. BRANCH.

Q Mr. Lindsley, I hand you a copy of the opinion—this particular copy isn't signed, but I think it is either from Mr. Day or Day, Berry & Howard, addressed to Mr. Campbell, May 28, 1940, and I ask you whether that was a copy of the opinion that you saw at or about that time? [2296] *A* So far as I can recall, that is a copy. It is the substance of my memory at least.

* * * * * * [2297]

Redirect Examination by Mr. WAHRENBROCK.

* * * * * * *

Q Do you know whether the Borough of Groton electric [2298] organization, whatever the name of it is, whatever the department is, serves customers in the Town of Ledyard? *A* I understand so, yes.

Q Has The Connecticut Light and Power Company made any representation to Mr. Tiffany or to any of the Board of Commissioners under which he works with reference to the discontinuance of electric service by their organization to customers in the Town of Ledyard? *A* Not that I know of.

* * * * * * [2301]

By Mr. Wahrenbrock: *Q* Have you taken any acts, any steps, to indicate to the Borough of Groton or to any of its representatives that in order to procure a renewal of a contract or a new contract for the supply from you, they would first have to discontinue serving customers in the town of Ledyard? *A* I do not think that they were ever told that by me, [2302] because I did not know at the time counsel's letter was discussed with them that they were doing so.

Q You knew that they were serving customers in the town of Ledyard? *A* I did not at that time, to the best of my memory.

Q You knew at that time that they were serving customers on Groton-Long Point, didn't you? *A* Yes, and I assumed that that was within their franchise territory.

Q Did you assume that that was within the Borough of Groton? *A* I understood that that was within their chartered territory.

Q I asked you a different question. I asked you if you understood that that was within the Borough of Groton. Did you understand that Groton-Long Point was within the Borough of Groton? *A* I said that I knew nothing about the geographical subdivisions of the town of Groton, and I think that I stated that I didn't know there was a Borough of— What is this? Borough of Groton?

Trial Examiner: Groton-Long Point?

The Witness: Yes.

By Mr. Wahrenbrock: *Q* Now, Mr. Lindsley, we don't seem to be getting an answer [*2303*] to the question.

Mr. Branch: I think he has answered the question.

Trial Examiner: I think he has answered it. He said he didn't know there was a separate Borough of Groton—Long Point.

Mr. Wahrenbrock: I asked him if he assumed that Groton-Long Point was in the Borough of Groton.

Trial Examiner: He may answer that question.

A That the Borough of Groton-Long Point—

By Mr. Wahrenbrock: *Q* No. I asked you if you assumed that Groton-Long Point—you have heard of Groton-Long Point? *A* I have heard of Groton-Long Point.

Q You know where it is? *A* No, I can't say that I do know where it is.

Q Have you ever been there? *A* I have been down to the Hotel Griswold at Groton, the Shenoccossett Golf Club.

Q Have you ever been down to the Groton-Long Point high-voltage station that belonged formerly to The Connecticut Light and Power Company? *A* I have driven along the shore of what I understood was Groton-Long Point.

Q Have you ever been to the little so-called Groton-Long Point brick substation? *A* I think I have driven by that, yes.

[*2304*] *Q* Did you understand that that was Groton-Long Point, in that vicinity? *A* Yes.

Q Did you assume that Groton-Long Point was part of the Borough of Groton? *A* I did.

* * * * * *

Recross Examination by Mr. BRANCH.

Q Mr. Lindsley, if I understand it, no new contract has been made with the Borough of Groton since the contract expired, is that correct? *A* No formal, written agreement has been made.

Q Now, when that written agreement expired, you continued to serve the Borough of Groton, didn't you? *A* Yes.

Q And during some of that time the submarine cables were connected with Fishers Island, as you knew, isn't that true? *A* That is right.

Q I show you a letter—I think a copy of it appears in the Stipulation, but I show you what purports to be a copy of a letter dated June 14th, 1940 from you to Mr. A. N. Tiffany, [*2305*] Superintendent at Groton, Connecticut, and ask you whether that does appear to be a copy of a letter which you wrote Mr. Tiffany at about that date? *A* It does.

Q In that letter, did you say:

> "This will confirm the conversation which I had with you and Mr. Henry Gamber, treasurer of the Board, relative to a contract for the supply of electric power to the Borough to replace the contract expiring September 29th, 1940.
>
> "When the Borough is in a position to contract for a supply of electric power for resale and ultimate use entirely within the chartered territory of the Borough of Groton, we will be glad to enter into a new agreement to furnish the electrical requirements of the Borough, under the con-

ditions which we discussed and considered mutually agreeable on June 11th, 1940."

Did you write that to Mr. Tiffany? *A* Yes.

Mr. Wahrenbrock: Mr. Examiner, I object to the question.

Trial Examiner: On what ground?

Mr. Wahrenbrock: As going beyond the scope of the redirect and hence being improper re-cross.

Mr. Branch: May I state my purpose?

Trial Examiner: You may.

Mr. Branch: The inference apparently is that there is something inconsistent in the attitude of the Company. Accord- [2306] ing to Mr. Wahrenbrock's contention there are some customers served in Connecticut which the Borough has no right to serve. I don't know that that is so under the construction of the Charter, I don't know that situation well enough to say, but assuming that that is so, I want to show that the position of the Company in regard to this *ultra vires* act is not to tie up itself to a contract which might bind it and put it in an awkward position, and that that statement which he made is a fundamental statement which applies to all these things.

Trial Examiner: I think the question may very well be something that should properly have been asked on cross-examination. However, I will permit it, with the understanding that the Commission's counsel shall have the further right to question as of the direct.

Mr. Branch: Very well.

By Mr. Branch: *Q* Did you write Mr. Tiffany to that effect? *A* I did.

Q And has that been the position of your company right along? *A* It has.

Q And, as I understand it, no new contract has been made with the Borough? *A* No.

Q After the contract expired you did continue to sell [2307] the Borough, even while it was supplying Fishers Island, did you not? *A* We did.

* * * * * * [2314]

SAMUEL FERGUSON,

a witness called on behalf of the Federal Power Commission, being first duly sworn, testified as follows:

Direct Examination by Mr. WAHRENBROCK.

Q Will you state your full name for the record, please. *A* Samuel Ferguson.

Q Your home address? *A* Residence address, 851 Prospect Avenue; business address, 266 Pearl Street.

Q Hartford, Connecticut, in both cases? *A* Hartford, Connecticut.

Q What positions do you hold with The Hartford Electric Light Company? *A* President and chairman of the board.

Q What positions do you hold with The Connecticut Power Company? *A* The same positions, president and chairman of the board.

[2315] *Q* How long have you been president of The Hartford Electric Light Company? *A* I was elected president of the company in 1924, chairman of the board in 1935, and resumed the office of president along with the position of chairman in 1939.

Q How long have you been president of The Connecticut Power Company? *A* Twenty or twenty-one years. No. With the same interval as to position of chairman of the board, and not president, as in the case of the Hartford Company.

Q And what is the total period of time you have been an officer or employee of The Hartford Electric Light Company or a predecessor company thereof? *A* I have been with The Hartford Electric Light Company 28 years.

* * * * * * [2336]

Mr. Wahrenbrock: Mr. Examiner, during the recess, counsel for the respondent and the witness and the Commission counsel have been in a huddle, and from what Mr. Ferguson has told me, it appears that the arrangement of some of the materials which

are included in Exhibit 44 for Identification, as those materials appear in the Commission's files, is misleading, and in order to avoid any misleading effect from designating all of these materials which have heretofore been marked for identification in one group as Exhibit 44, it is now proposed that they be separately identified. And for that purpose, then, I am going to go through what has up to now been marked for identification as Exhibit 44, with Mr. Ferguson, and ask him to make a few statements about the several sheets, page [2337] by page, and simultaneously ask the separation of the Exhibit 44 for Identification into several parts, and separate identification of the parts.

Trial Examiner: All right.

By Mr. Wahrenbrock: *Q* Mr. Ferguson, do you have before you the reporter's copy of Exhibit 44 for Identification? *A* Yes, sir.

Q Now, beginning at the top sheet, will you state whether the following four pages, that is, in the order in which they appear, a sheet with the date October 25, 1935, and the heading "Interpretative order"; the next sheet with the date October 25, 1935, and headed "Point A—substation of the Hartford Electric Light Company"; and the next sheet with the No. 2 at the top, and the date October 25, 1935, and the first heading, "Point D"; and the next sheet which is simply a map, principally of the State of Connecticut, and certain lines drawn on it with a legend in the lower right-hand corner; and I ask you if those four sheets are the memorandum referred to in the first paragraph of the top letter of October 25, 1935? *A* They are.

Mr. Wahrenbrock: Mr. Examiner, I ask that the exhibit heretofore marked as Exhibit 44 for Identification be separated and the letter of the four sheets—

Trial Examiner: You don't have to have permission, in [2338] view of the fact that it is only marked for identification. It is not in the custody of the reporter until it is in evidence, and up to that time it is the property of the person offering it.

Mr. Wahrenbrock: All right. I then propose to separate the exhibit which has been marked for identification Exhibit No. 44. I propose to separate it, and have these first five sheets continue to be identified as Exhibit 44 for Identification.

Trial Examiner: I suggest that you make that 44-A, because the situation is that what was originally identified as 44 was never offered in evidence.

Mr. Wahrenbrock: All right. I ask that that letter and the four pages of that memorandum be marked for identification as Exhibit 44-A.

Trial Examiner: The letter and four pages of the memorandum attached, dated October 25, 1935, will be marked for identification as Exhibit 44-A.

By Mr. Wahrenbrock: I now direct your attention to the next three sheets of what was Exhibit 44 for Identification, consisting of the letter of September 27th, the sheet headed September 27, 1935, "Present situation", and the following sheet which has the number 2 and the heading "Objectives sought", and ask you whether that is the letter and the attached memoranda referred to in the first paragraph of the [2339] letter that you sent to the Commission on September 27th? *A* It is, to the best of my knowledge and belief.

Mr. Wahrenbrock: I ask that that be marked for identification as Exhibit 44-B.

Trial Examiner: That consists of three pages?

Mr. Wahrenbrock: Yes.

Trial Examiner: It will be so marked.

(The document referred to above was marked as Exhibit No. 44-A for Identification.)

(The document referred to was marked as Exhibit 44-B for Identification.)

By Mr. Wahrenbrock: *Q* Mr. Ferguson, I now direct your attention to the next two pages of what was Exhibit 44 for Identification, the first of them having the date at the bottom, October 2, 1935, and the heading at the top, "As to existence of emergency",

and the second one, a sheet of three paragraphs lettered small "a" and small "b" and small "c", and ask you what those two sheets were?

Mr. Branch: Excuse me. Which sheets are these, Mr. Wahrenbrock?

Mr. Wahrenbrock: I show you the two sheets.

The Witness: The first sheet which seems to be undated, according to my recollection—

By Mr. Wahrenbrock: [*2340*] *Q* I believe the first sheet is dated. *A* No—a, b and c.

Q Thank you. I am mistaken. I interrupted you. Will you continue? *A* Will you read which I have said?

(Whereupon the last answer as above recorded, was read by the reporter.)

The Witness: —should be attached to the second sheet which is dated October 2nd, as memorandum prepared for a conference with the chairman of the Federal Power Commission, which was held on October 3rd.

Q And was that memorandum of two pages submitted to Mr. McNinch by you? *A* It was discussed, and I believe submitted, as you advised me that they were taken from the files of the Commission.

Q Yes, and in that connection, I show you the originals of which these are photostats, in the files of the Commission. *A* They are the originals of the photostats to which I refer.

Q Thank you.

Mr. Wahrenbrock: I ask, Mr. Examiner, that the two sheets bound together be marked for identification as Exhibit 44-C.

Trial Examiner: The reporter will so mark them.

[*2341*] (The document referred to was marked as Exhibit No. 44-C for Identification.)

By Mr. Wahrenbrock: *Q* I now direct your attention, Mr. Ferguson, to the next two sheets of what was Exhibit 44, the first of which is headed September 28, 1935, memorandum, "Objections to title 2, Public Utility Act of 1935", and the second of which is

headed, "September 28, 1935, Objections to Title 2, P.U.A. 1935", and ask you what those two sheets are? *A* They are a statement of my principal objections to operating under Title 2 of the Act. My recollection is that they were prepared for internal company use, but that I also took them with me, and they were the subject of the discussion with Mr. McNinch referred to in my previous answer.

[*2342*] *Q* Did you hand them to Mr. McNinch or leave them with Mr. McNinch or some representative of the Federal Power Commission? *A* It would not have been with any representative of the Federal Power Commission, other than Mr. McNinch himself, because the conference was quite confidential on the subject, and as they appear in the files of the Commission I assume it was left with Mr. McNinch on that occasion.

Mr. Wahrenbrock: I ask that the two pages which have just been described be marked for identification as Exhibit Number 44-D.

Trial Examiner: The two pages referred to—

Mr. Branch: Are you offering something in evidence?

Trial Examiner: —will be marked for identification as Exhibit 44-D.

(Document referred to was marked Exhibit Number 44-D for Identification.)

By Mr. Wahrenbrock: *Q* Now, Mr. Ferguson, directing your attention to the last two sheets of what was Exhibit 44 for Identification, the first one being on the letterhead of The Hartford Electric Light Company under date of September 16th, 1935, the second being headed with the number "2", Federal Power Commission, September 16th, 1935, and ask you what those two sheets are. *A* They are my compliance with an order issued by the [*2343*] Federal Power Commission, order of September 11, of the Federal Power Commission.

Q And that is, the two pages together constitute a letter which you wrote to the Commission? *A* Responsive to the order of the Commission.

Mr. Wahrenbrock: I ask that those two pages bound together be marked for identification as Exhibit 44-E.

Trial Examiner: The two pages just referred to bound together will be marked as Exhibit 44-E for Identification.

(Document referred to was marked Exhibit Number 44-E for Identification.)

By Mr. Wahrenbrock: *Q* Mr. Ferguson, I now direct your attention to Exhibit 44-A for Identification, and particularly to the first paragraph, in which you state:

> "We believe all companies concerned will agree to a reconnection of their lines if the Commission would be willing to make an interpretative order."

A My personal belief.

Q I beg your pardon? *A* I thought you were through, excuse me.

Q I ask you if that was your belief. *A* That was my personal belief. I used the term "we" editorially. It was my personal belief.

Q Will you explain the bases upon which you held that [*2344*] belief, what reason you had for holding that belief?

Mr. Branch: Well, it seems to me we are getting away beyond any issue in this case, and I am going to object on the ground that it is entirely immaterial.

The Witness: The basis of my belief was—

Trial Examiner: Mr. Ferguson, there is an objection to answering the question. I admit that it is approaching a close line. However, I think it is still within the realm of proper examination and will be admitted. An excepion will be noted. *A* The belief was based on the assumption that a condition that was satisfactory prior to the cutting of the lines would also be satisfactory after the restoration of the lines, if the conditions existing prior to the cutting were restored, as far as jurisdiction of the Federal Power Commission was concerned.

By Mr. Wahrenbrock: *Q* Did you discuss the subject covered

by the attached memorandum, with any representative of The Connecticut Light and Power Company? *A* I did not.

Q Did you— *A* Unless long afterwards.

Q Did you bring it to their attention? *A* I did not.

[2345] *Q* The statements made in this memorandum attached, which is part of Exhibit 44-A for Identification, were never brought to the attention of any of the officers of The Connecticut Light and Power Company? *A* Not unless subsequent to the sending of the letter.

Q Well, were they ever, subsequently? *A* I should say probably casually, much later, but nothing to do with their preparation.

Q How much later? *A* After the proposal of working out a mutually satisfactory method of operation, with the Federal Power Commission, was definitely canned, definitely abandoned, excuse me.

Q What was the purpose of bringing it to the attention of The Connecticut Light and Power Company then? *A* Casual matter of interest.

Q Well, will you explain further why was it a matter of interest? *A* An effort I made to restore conditions, which was unsuccessful, was a matter of interest, I thought, to Mr. Campbell, and I think I told him what I had been trying to do.

Q Did you discuss it with him? *A* I have no recollection of it, but undoubtedly I talked with him about what I had been trying to do.

* * * * * * [2347]

Q At any time subsequent to October 25, 1935, has any officer or representative of The Connecticut Light and Power Company objected to the accuracy or pointed out any inaccuracy of any statement made by you in this Exhibit 44-A for Identification?

[2348] Mr. Branch: Well, I object to that. It seems to me that has no materiality. It hasn't appeared that counsel for The Connecticut Light and Power Company had any knowledge of

these things up to the time of the present hearing, and I don't understand it to be the fact.

Trial Examiner: I don't understand that the question mentions counsel. May I have the question read back?

(Question read by the reporter.)

Trial Examiner: I think the question may be answered, and call Mr. Branch's attention to the fact that counsel are not mentioned. It is an "officer or representative".

Mr. Branch: It doesn't appear, sir, that any representative of the Company saw a copy of this thing. There is no evidence whatever of that, I think. Although I got the question as just referring to counsel, it is equally applicable as to any representative.

Trial Examiner: Does counsel for the Commission desire to be heard on that point?

Mr. Wahrenbrock: I would like to have the question read again, please. I direct attention to the fact that it does not depend upon this memorandum having been shown to the respondents.

Trial Examiner: The question will be read for the benefit of Commission's counsel.

(Question read by the reporter.)

[2349] Trial Examiner: I think the witness may answer the question. *A* I have never had pointed out to me any inaccuracy. I have had comment made of talking about facilities that belonged to some other than my own company.

Trial Examiner: May I hear the last sentence of that answer?

(Last sentence of the answer is read by the reporter.)

[2350] By Mr. Wahrenbrock: *Q* Mr. Ferguson, I show you Exhibit 47 for Identification, and ask you whether—I had better show you the reporter's copy. I show you Exhibit 47 for Identification. I ask you if that is a letter with attached memorandum which you sent to Mr. Roraback on November 19, 1935? *A* I believe it is. The letter bears my signature, and I believe that the memorandum attached is the memorandum that went with the letter. And in this connection it appears that I sent—communicated with

The Connecticut Light and Power Company other than casually, prior to the giving up of the attempt to come to an agreement, as this is dated November 19th, approximately only one month after my letter of October 25th to Mr. McNinch.

Mr. Branch: May I have the answer read, please?

Trial Examiner: The answer will be read for the benefit of respondent's counsel.

(Whereupon the last answer as above recorded, was read by the reporter.)

By Mr. Wahrenbrock: *Q* Mr. Ferguson, I direct your attention to Exhibit 47 for Identification and Exhibit 44-A for Identification, and ask that you compare the memoranda which are attached respectively to those letters, and ask you this question, whether with one exception, the two memoranda are in substance identical, and [*2351*] the exception to which I refer is that on the first page of the memorandum which you sent to Mr. McNinch there are nine points under the heading, "Interpretive order", whereas on the first page of the memorandum which you sent to Mr. Roraback on November 19th, there are only eight points, the ninth one in the memorandum to the Commission being omitted from the memorandum to Mr. Roraback. The question then being whether with that exception the two memoranda are substantially —I am not asking word for word and comma for comma, but in substance the same memorandum. *A* I believe they are in substance. I haven't checked the phraseology, but the substance, with the exception of No. 9, is the same.

* * * * * * [*2352*]

Q Having written this letter of November 19th to Mr. Roraback with the memorandum therein enclosed prior to what you have referred to as the abandonment of your attempt with respect to the Federal Power Commission, did Mr. Roraback indicate to you any interest in your attempt with the Federal Power Commission. *A* He didn't know about them.

Q I refer to the period after the letter of November 19, 1935. *A* Oh, after that period?

Q Yes. *A* I had no contact with him.

* * * * * * [2353]

The Witness: I desire to correct my testimony. I have introduced a confusion here which I would like to correct.

Trial Examiner: All right, you may do so.

The Witness: This letter to Mr. Roraback has no reference whatever, although I carelessly in my previous answer assumed it had, to the efforts that I was advisedly making to reach[2354] an agreement with the Federal Power Commission. This letter to Mr. Roraback states what we propose to do after Hartford had transferred, sold all its transmission facilities to The Connecticut Power Company, and that The Connecticut Power Company restored the lines, and we asked and we stated in the memorandum to Mr. Roraback why we believed that Hartford was clear of contamination under the circumstances, and we expressed the hope that he would take the same position as Hartford did. That had nothing whatever to do with the conferences which I was confidentially, or personally anyhow, if not confidentially, carrying on previous to this with Mr. McNinch, as to the possibility of the Commission solving the difficulty by the use of the emergency section of the Act.

By Mr. Wahrenbrock: *Q* Is that also true with respect to your efforts to obtain an interpretive order from the Commission? *A* It is. The had no knowledge of my personal efforts with regard to the interpretive order, which was an effort to work out a cooperative agreement with the Commission by which the lines could be restored without making other changes. This letter refers to other changes that were made after that plan was found to be not feasible.

Q Now, when you say The Connecticut Light and Power Company had no knowledge, do you mean until after your attempt had been abandoned? [2355] *A* That is what I meant, and what I tes-

tified to previously. I was careless in reading this exhibit that you placed in my hands, in thinking that that referred to the interpretive order or discussions on the interpretive order which it does not.

Q Do I understand you to mean that The Connecticut Light and Power Company never knew of the efforts that you had made? *A* They knew of them subsequently, but not at the time. It was a personal effort on my part, and largely confidential between myself and Mr. McNinch. I assured Mr. McNinch in the conference of October 3rd, that if we saw fit to use the powers of the Commission under the emergency section, that the initiative would come from him, and we would simply obey, or not resist the orders that he might issue under them.

Q And in your communications with Mr. McNinch, you did not act upon behalf of The Connecticut Light and Power Company in any way? A In no way, shape or manner.

* * * * * * [*2356*]

Q I am directing your attention to the second paragraph—the second page of the memorandum under the heading, "Point A, substation of The Hartford Electric Light Company", there occurs this statement: "This substation", referring to the substation of The Hartford Electric Light Company, "has two functions: One, to deliver power generated by Hartford to The Connecticut Power Company. This power is eventually sold by The Connecticut Power Company, according to its business necessities, to customers both within and without the State." And I ask you if that was in your opinion a true statement? *A* I believe that that is the fact. The Hartford Company sold to The Connecticut Power Company, and it was none of our business what they did with the power.

[*2357*] *Q* And the second statement: "To refer to power purchased from The Connecticut Power Company, the power so purchased may, according to the business necessities of The Connecticut Power Company, have been generated in its own plant or purchased in whole or in part from other companies within or

without the State",—and in your opinion, was that a true statement? *A* It was. It was no business of ours where the power came from, but it was a matter of knowledge that they exchanged transactions, power was exchanged with the Massachusetts Company.

Mr. Wahrenbrock: I will have to ask to have that re-read by the reporter.

Trial Examiner: The answer will be re-read. Is the question clear in everybody's mind? Mr. Branch, do you desire the answer or also the question?

Mr. Branch: Just the answer.

Trial Examiner: The answer will be read.

(The answer is read by the reporter.)

A Before the next question—

By Mr. Wahrenbrock: *Q* Yes, indeed—? *A* (Continuing)—may I further explain the answers to the last two questions, referring to this memorandum which was a memorandum of intent for the future? It was not a memoran- [2358] dum reciting practices. It is referred to in the letter of November 19th, "It is our plan to reconnect these lines and to stand on the proposition that while such connections make The Connecticut Power Company a public utility under the Act, that all transactions in the State between The Connecticut Power Company and the other companies are intrastate and do not bring such other companies under the definition."

Then a memorandum is on the proposition that we propose to reconnect the lines and to stand on the proposition as proposed in the memorandum. It was not a recitation of facts which had been going on, although there might be.

By Mr. Wahrenbrock: *Q* Yes, because at that time, the H-A and E-lines were disconnected at the State boundary. *A* That is correct.

* * * * * * [2359]

Q I wish to direct your attention to the next heading on the same page of that memorandum which is part of Exhibit 44-A for

Identification, under the heading "Points B and B-1, substations of The Connecticut Light and Power Company", and particularly to this statement: "These are points of delivery",—and I ask you first, what are the points B and B-1 which are referred to as "These"? *A* The marks indicated on the map as B and B-1.

Q That would be the Trails—That would be the Groton Long Point substation and the Trails Corner substation of The Connecticut Light and Power Company? *A* I have no knowledge of the names.

Q Well, how would you identify those points? *A* As points on the lines of The Connecticut Light and Power Company, or the Groton Municipality, located between Montville and Groton-Long Point.

[*2360*] *Q* With that explanation then, I continue with the reading:

"These are points of delivery for power sold by The Connecticut Light and Power Company to the electric department of the Town of Groton. This power is eventually sold by Groton to its customers within the State. One of these customers, Fishers Island Farms, transmits the major portion, but not all of the power so purchased, to Fishers Island, New York." And I ask you whether that was a true statement.

Mr. Branch: Well, I object. I don't think that it appears that this witness has knowledge, personal knowledge, of those facts, and it doesn't seem to me that that is a proper way of bringing out that fact, if it is important. Certainly it isn't proper to just read one's own witness something that he stated and then say "Is that a fact?"

Trial Examiner: In view of the objection taken, I think it is advisable that Commission counsel lay a background of knowledge in asking the question.

By Mr. Wahrenbrock: *Q* Mr. Ferguson, do you have personal knowledge of how the Fishers Island electrical requirements were served at the time of this memorandum? *A* It is rather difficult to state personal knowledge. It was, I thought, a well-

known fact, that Fishers Island received its supply from Groton-Long Point. I did have personal know- [*2361*] ledge, because I once saw the contract between Fishers Island and the Municipality of Groton, but I have never seen the substrations or the facilities used.

Q What would you say was the purpose for which you put in these two paragraphs under "Points B and B-1", in your memorandum?

Mr. Branch: I object to his purpose as immaterial.

Trial Examiner: I don't think the witness's purpose is material. The objection is sustained.

By Mr. Wahrenbrock: *Q* What was the interest of The Hartford Electric Light Company or The Connecticut Power Company in obtaining from the Federal Power Commission an interpretative order with respect to facilities of The Connecticut Light and Power Company at points B and B-1 as mentioned in this memorandum?

Mr. Branch: Well, I object to it. I don't think it makes any difference what the idea was.

Trial Examiner: That may be material. The witness will answer the question. *A* It would be necessary for such an order to be of any value, to cover every point of either company's system, which might be called in question by anybody.

* * * * * * [*2364*]

Q Mr. Ferguson, I show you Exhibit 78 for Identification and ask you if that is a letter, a copy of a letter written by you? *A* I wrote such a letter and, subject to possible checking for error, I believe this is a copy of the letter I wrote Mr. Peabody as of December 5th.

Q What was the occasion of your writing such a letter? *A* A reply to his of the 4th.

Q Concerning what question? *A* The reconnection of the transmission lines which at that time were—of the interstate transmission lines which at that date were open.

Q The reconnections at the Connecticut-Massachusetts boundary of the HA lines at the New-York-Connecticut boundary of the E line? *A* At least the Connecticut-Massachusetts line. I am not sure that his referred to the other line.

Q Yes. Did the course of action which the companies you were connected with depend in part upon the action which would be taken by The Connecticut Light and Power Company? *A* We would take no action without consulting them, as they were parties to the Exchange prior to the severance of the line.

[*2365*] *Q* And at the time of writing this letter, had you consulted with The Connecticut Light and Power Company concerning its attitude toward the reconnections? *A* Yes, as shown by one of the exhibits, a letter to Mr. Roraback, under the date of November 19th.

* * * * * * [*2368*]

Q Had anyone on behalf of the Connecticut Light and Power Company, by December 5, 1935, advised you of the position [*2369*] of the Connecticut Light and Power Company, with respect to the reconnection of the Hartford-Agawam lines at the Connecticut-Massachusetts State boundary? *A* It is of course impossible to recollect as to absolute dates, but by December, 1935, I had been advised that they would not go ahead with it, would not continue to be connected, in case of reconnection.

Q Now, who had so advised you? *A* I believe it was Mr. Roraback, referring again to the so-called conference that I referred to in my previous testimony.

Q Had he, in so advising you, referred to the advice of counsel which he had obtained? *A* I believe he did do so.

Q And did he state to you what that advice was? *A* I have found in my files a copy of counsel's opinion, which my presumption is, but not my definite recollection, that it was handed to me at that time. Later, of course, the value of that opinion was somewhat clouded by the fact that it was based on the Act as originally introduced and not as finally passed.

* * * * * * [2370]

Q Mr. Ferguson, will you explain who Mr. Peabody was? *A* He was a member of the firm of Peabody, Brown, Rowley and Storey, Boston lawyers and attorneys for the Turners Falls [2371] Company.

* * * * * * [2374]

Q Mr. Ferguson, by December 5, 1935, what had Mr. Roraback advised you was the advice of counsel of The Connecticut Light and Power Company with respect to the reconnection—the maintenance of its connections with the Connecticut Power lines in the event of the reconnection of the Hartford-Agawam line?

Mr. Branch: I have no objection to that form of question, assuming it also means if any advise were given, other than my general objection to this line of inquiry. I think it ought to appear, though, whether Mr. Roraback had made any statement.

Trial Examiner: I think the witness can take care of that [2375] in his answer?

Mr. Wahrenbrock: That already appears in the testimony, and inasmuch as it does appear, I don't see any occasion for the interruption.

Trial Examiner: The witness may proceed and answer the question.

The Witness: I thought I had answered that question previously. At the time of the so-called conference, when we received an answer in the negative to their continuing connection to the Connecticut Power lines, in case of reconnection. I also stated that I thought because I subsequently found an opinion of counsel in my files, that that was given to me at that time. My recollection is that the reason for disinclination to connect was the chance that they would be interpreted thereby to be in interstate commerce, or under the jurisdiction of the Federal Power Commission, which would involve them in proceedings and lawsuits.

* * * * * *

Q Mr. Ferguson, is your present recollection on that subject

based upon this legal opinion from Mr. Thoms, to which [2376] you have referred? *A* Largely.

Q That was found subsequently? *A* It was found subsequently, and I know of no way of having received that unless it was given to me at the so-called conference when we received the negative answer to our suggestion.

Q Yes. Now, can you by referring to Exhibit No. 78 for Identification, refresh your recollection as to what your knowledge of Mr. Roraback's advice to you, what your knowledge was as of December 5, 1935? *A* Simply a refusal on the grounds of possible contamination.

Q I don't believe I make my question clear. I want to know whether you can refresh your recollection now by looking at this Exhibit No. 78 for Identification, as to what your knowledge was on the 5th of December, 1935? *A* It doesn't bring back anything.

Q You are unable to state then what you knew on December 5, 1935 of Mr. Roraback's statements to you concerning the advice of his counsel? *A.* I have stated my recollection, of a refusal on the ground of, I stated, of an assertion of jurisdiction by the Federal Power Commission, or possibly assertion of jurisdiction by the Federal Power Commission, and that at the same time I [2377] was given an opinion of counsel with reference to the matter.

* * * * * * [2378]

Q Mr. Ferguson, isn't it a fact that by December 5, 1935, Mr. Roraback had advised you that the counsel of The Connecticut Light and Power Company had advised that company, or had advised him, that there was serious danger of all transmission lines connecting with those of The Connecticut Power Company being adjudicated as facilities under the control of the Federal Power Commission?

Mr. Branch: Mr. Examiner, I think that is just a question that has been objected to throughout, and I think you ruled it is improper. The witness has stated—

Trial Examiner: It is improper on direct examination. There is a proper procedure if counsel has any question.

Mr. Wahrenbrock: Mr. Examiner, I point out that I have [2379] laid the basis to probe the witness's recollection, and I think that a sufficient basis has now been laid for such a question to be asked.

* * * * * * [2381]

Trial Examiner: To the extent that the statements may be contradictory, the question will be permitted.

Mr. Wahrenbrock: May the question be read, please?

Trial Examiner: The reporter will read the question to the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: I do not recall that Mr. Rorabock ever told me that his negative answer to our suggestion was on advice of counsel. I naturally assumed it was on advice of counsel, when I found the opinion of counsel, which I have referred to, was an erroneous opinion because it was based on the Act as introduced, instead of the Act as passed.

* * * * * * [2386]

Mr. Wahrenbrock: I offer Exhibit 44-A for identification, in evidence.

Mr. Branch: I would like to examine it. I object on the ground that it is immaterial, it not appearing that this document ever came to the attention of any representative of The Connecticut Light and Power Company, or even if it did, of having any bearing in the case.

* * * * * * [2388]

Trial Examiner: It appears to the Trial Examiner that this matter may well be said to have some relevance to the [2389] case at issue. This is not a matter before a jury where there is liable to be a confusion as to the two exhibits or proposed ex-

hibits, and the Trial Examiner rules that the exhibit now marked No. 44-A for Identification is admitted, and an exception will be noted for the respondent.

(Exhibit 44-A for Identification received in evidence as Exhibit 44-A.)

* * * * * * [2395]

Cross Examination by Mr. BRANCH.

Q Mr. Ferguson, I think you testified that you wrote a letter to Mr. Peabody, and made in it a statement as to what the Connecticut Light and Power counsel had advised. Do you recall making such a statement? *A* I recall the letter was under discussion.

Q Now, in that letter to Mr. Peabody, were you doing anything more than to state your understanding of the meaning of an opinion from Mr. Thoms, a copy of which had been sent to you? *A* I believe I stated previously that I received a negative answer to our proposal, and I thought that at the same time I received an opinion of counsel on the matter, and in my letter to Mr. Peabody I used the words that they had been advised by counsel, which was an inference on my part, rather than a fact of knowledge on my part.

Q Well, in your discussion of what counsel had advised them, were you doing anything more than giving a statement of your understanding of the substance or reasoning of that opinion [2396] from Mr. Thoms? *A* My statement to Mr. Peabody was derived from my reading of Mr. Thoms' opinion.

Q Entirely? *A* Entirely.

Q I think you have stated, Mr. Ferguson, that your best recollection was that Mr. Roraback, and possibly some other representatives of The Connecticut Light and Power Company, advised you of their determination not to connect. Do you recall? *A* I recall that.

Q Now, was Mr. C. L. Campbell present at that time, according to your best recollection? *A* I do not recall that he was or

was not. My recollection of the attendance is rather hazy, and I would not like to take oath either as to his presence or his absence. I would not have expected him to be there.

Q And have you any recollection of talking with Mr. Campbell about this matter of The Connecticut Light and Power Company's disconnecting during that fall? *A* No, sir.

* * * * * * [*2400*]

CALVIN T. HUGHES,

a witness previously sworn, resumed his testimony:

Direct Examination (*Continued*) *by* Mr. WAHRENBROCK.

* * * * * *

[*2401*] *Q* When was the decision reached to supply the East Hampton-Leesville-Colchester District by a line from Columbia? *A* Well, it would be late in '38 that the final decision was made.

Q I didn't hear you. *A* It would be some time in the Fall of '38, I believe. But it was anticipated in '36.

Q When you say "It was anticipated", what do you mean by that? *A* Well, in negotiating the contract for the supply of the East Hampton District by The Connecticut Power Company in 1936, I believe it had a provision in it that at any time after December 31st, 1939, The Connecticut Light and Power Company could take that load over and supply it from its own system. That is substantially right. I don't know whether those documents are in evidence or not, but that is reasonably right.

Q That is to say, at the time the contract for the supply of that district by The Connecticut Power Company at Pole 110 was negotiated in 1936, it was contemplated by The Connecticut Light and Power Company that it would subsequently serve that district from its own sources? *A* That is correct.

Q And that contract was made to run for a shorter period of time, or to be terminable on notice, in order that [*2402*] that might be done? *A* That is correct, and I believe it was to end December 31st, 1938 or January 1, 1939, because, I recall that we

made temporary arrangements from the first of the year until June 30th because we didn't get the facilities built to take it over.

[*2403*] Mr. Wahrenbrock: If I may have just a moment until we can locate Exhibit 25.

By Mr. Wahrenbrock: *Q* I call your attention to Exhibit 25, which is the agreement of December 16, 1936, between The Connecticut Power Company and The Connecticut Light and Power Company, whereby the Connecticut Power Company agreed to supply electric energy for the East Hampton section of The Connecticut Light and Power Company, and direct your attention to the term of that agreement as fixed in article 5, and ask you whether that is the provision to which you had reference? *A* That is what I had in mind.

Q Who owned the meter at pole 110? *A* I believe it was the Connecticut Power, but I wouldn't be too certain of that. I am under that impression, that it belonged to the Connecticut Power. I wouldn't be too sure of that, though.

Q I wish to refer now to the Bristol substation of The Connecticut Light and Power Company, and to the matter of the operating instructions under which the operator of that station operates the controls for the oil circuit breakers on the CP1 and CP2 lines at Tower 474, and wish to ask you why the operator of The Connecticut Light and Power Company's substation follows the instructions concerning which Mr. Colvin has testified in this hearing? [*2404*] *A* That—I presume you want to know the circumstances surrounding our operators performing that function.

Q Yes, what instructions he has from you to obey those instructions? *A* I wouldn't say there isn't specific instructions, because there may have been. I will just try to outline it as it comes to my mind, without too much maybe written matter to go by. I haven't anything written. That situation as I first became acquainted with it was along in 1928 or 1929—1928, I believe. And then, I think since inception of that service in Bristol, the Bristol operators had done that sort of thing as a courtesy to a

neighbor or a friend or a person whom they had been doing business with. It is purely from the point of view of giving better service. It might be incident to some delay, if it was handled some other way. Just how much, I never made a study of, and as a matter of fact, we never gave it much thought, and I am pretty sure that in years past some of our operating people—I mean that are close to the operating—maybe met with some of the Connecticut Power people and discussed the things as indicated in a letter, I believe, that was put in evidence here, or was referred to yesterday, as some instructions by Mr. Whiting. Aside from that general courtesy point of view, I know of no other reason for it. It is something we never gave any particular attention to. It doesn't amount to anything so far [*2405*] as we are concerned, and for that reason we haven't given it any particular attention.

Q Is it a matter which has been done without the knowledge of the officials of the company? *A* I can't say that, that it is without the knowledge; I believe probably some of the operating people knew about it.

Q You had known about it? *A* I knew that they performed that function, yes.

Q You never issued any instructions that they were not to do it? *A* No. No.

Q Or no fault was ever found with the operators at Bristol for following those instructions? *A* No.

Q As a matter of fact, if they hadn't followed them, fault might have been found with them? *A* I don't think so. I don't believe that we particularly accepted responsibility for the action at all, because whatever switching was done there was entirely under the responsibility of the Connecticut Power Company people, without either approving or disapproving it. We knew it was being done, and we made no effort to either approve or disapprove it. I will put it that way.

Q What is the nominal voltage at which the synchronous condensers of the Connecticut Light and Power Company at Bristol

[2406] operate? *A* I believe 13,800, or 900. I just don't recall exactly, but I think it is 13,800 or 900—I believe it is 13,800.

* * * * * * [2459]

DR. JOSEPH SLEPIAN,

a witness called on behalf of the respondent, being first duly sworn, testified as follows:

Direct Examination by Mr. BRANCH.

Q Will you please give your name? *A* Joseph Slepian.

Q Your address? *A* Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania.

Q What is your profession, Dr. Slepian? *A* Research engineer.

Q With what concern are you connected? *A* I am employed by the Westinghouse Electric and Manufacturing Company.

Q Will you please outline your education or preparation? *A* I received an A.B. degree at Harvard in 1911, an A.M. in 1912, Ph.D. in 1913 in Mathematics. I studied in Goettingen, Germany, and Paris, France, in 1913 and '14 in the fields of mathematics and physics. I taught mathematics at Cornell in 1914 and '15, and then I entered the employ of the Westinghouse [2460] Company.

Q Have you been with the Westinghouse Company ever since? *A.* Yes.

Q Will you outline your work, particularly in the electromagnetic field, since you have been with Westinghouse Company? *A* I worked for about a year in the shops, constructing various types of electrical power apparatus, and then have been in the research department ever since then. The first years were assisting in the making of tests of electrical apparatus and calculations on electrical systems. I became consulting research engineer after a year or two there and was engaged in consultation by the various departments of the Westinghouse Company, and then also in frequent consultation with utilities on questions relating to the operating of power systems. I was engaged in research and development of various types of power apparatus. I have made—

* * * * * *

A (Continuing) I have made numerous inventions, four or five of them are concerned with apparatus which are important items of manufacture by the Westinghouse Company. I became Associate Director of Research some three years ago and have [*2461*] held that position since then. I have written some forty or fifty technical papers, most of them published in the Transaction of the American Institute of Electrical Engineers. Some may be interpreted as bearing directly on the subject of my testimony here. I have written a book on "Conduction in Gases". I received the John Scott Medal of the Franklin Institute some years ago for work in conduction in gases. I have received one or two prizes from the American Institute of Electrical Engineers in relation to papers. I am a member of the American Academy of Sciences, a member of the corresponding body in France. I am a Fellow of the American Institute of Electrical Engineers, Fellow of the American Physical Society, a member of the American Mathematical Society, a member of the American Electro-Chemical Society.

Q Will you give a brief description of some of your inventions in the electro-magnetic field? [*2462*] *A* I invented the audio valve lightning arrester in 1920. This is an apparatus which is manufactured and sold by the Westinghouse Company for the protection of power systems and transmission distribution lines. I invented the Deion air circuit-breaker, the Deion oil circuit-breaker.

Q Is that spelled D-e-i-o-n? *A* Yes.

Q Will you continue? *A* These are all apparatus used in operating power systems. I invented the ignition mercury arc rectifier which is widely used for the conversion of alternating current into direct current for railway and chemical and electrical industries.

Q To what have you devoted yourself chiefly since you have been with the Westinghouse Company? *A* To technical problems relating to generation, distribution and the utilization of electrical power.

Q Have you seen line diagrams showing the facilities of the Connecticut Power Company at South Meadow station? *A* Yes.

Q Have you also examined diagrams showing the so-called Hartford-Agawam lines, the Connecticut Power lines, sometimes known as the CP1 and CP2 lines and the line sometimes known as the E line, that being the line which goes to the New York [*2463*] State line? *A* Yes.

Q Have you read those parts of the testimony of Mr. Harold Miller in the pending case which describes his method for preparing exhibits 61 and 62, and have you examined Exhibits 61 and 62, of which I now show you copies? *A* Yes, I have.

Q And have you also examined the facilities in the South Meadow substation in Hartford? *A* Yes, I have.

Q If electrical energy generated from two different sources is connected or is put on a common conductor which goes to a load, is it possible to determine which source supplies the load?

* * * * * *

The Witness: If each source is generating enough power to supply the load, then it is not possible to determine.

* * * * * * [*2465*]

Q Do you understand the nature and location of the metering devices which are in use at the South Meadow substation of the Connecticut Power Company at Hartford, confining it to the present? *A* Yes.

* * * * * * [*2467*]

Q Have you been at the South Meadow substation of the Connecticut Power Company? *A* Yes, I have.

Trial Examiner: I think possibly that may not go far enough. I think the statement should also show that he is familiar.

By Mr. Branch: *Q* Have you familiarized yourself with the nature and location of the metering devices, particularly the watthour meters in the South Meadow substation of the Connecticut Power Company at Hartford? *A* Yes, as far as it is possible by direct inspection and by asking the employees there.

* * * * * * [2468]

Q Will you describe in a general way as to what you know as to the location of the watt-hour meters in the substation of the Connecticut Power Company at Hartford? *A* It is a 66 kilo-volt line. It comes in over a bus structure. The connection is dropped down from the 66 kilo-volt line to instrument transformers which go to meters located in the control room of the station. The 110 kilo-volt line [2469] comes down to a transformer at the side of the bus structure and—

* * * * * *

A There is a corresponding arrangement made for metering the 110 kilo-volt lines, as I recall the construction. The power from the low-tension 11 k. v., I believe it is, comes into the station and goes to meters through appropriate transformers inside the station. The meters themselves being on the control board.

The outgoing 66 kilo-volt line, two circuits, similar arrangements are made for metering, lines are dropped from the high-tension lines down to instrument transformers and connections from the instrument transformers go to the substation to meters again on the control board.

* * * * * * [2470]

Q Are there ratchet watt-hour meters in the South Meadow substation? *A* Yes. The watt-meters I saw on the board were ratchet watt-meters.

Q Will you explain in a general way where there are watt-meters which would show anything in relation to the flow on the C-3 line, the lines going from this bus which is labeled 11 k. v. bus, and the lines further to the left, that is, to [2471] the west? *A* This diagram shows two 66 k.v. lines coming in from Massachusetts to the bus at the station. What I saw was 1 66 k. v. line and 1 110 k. v. line coming in. The watt-meters would be located in each of these lines, one now being a 66 k. v. line. Of course, that information I got by inquiry from the employee who showed me the station.

On the other bus, 66 k. v. line, I was told that the watt-meters which I saw on the board were connected to transformers which were connected to the 66 k. v. lines out in the bus structure.

The 15 k. v. lines the meters on the 15 k. v. circuit, I was told—

Mr. Branch: You said 15 k. v.

The Witness: 11 k. v., pardon me. And the 11 k. v. system, I was told, were in the lines coming from the 11 k. v. transformers in the station.

By Mr. Branch: *Q* Well, assuming then that there were at all times here ratchet meters showing flow in either direction, on all of the points you have indicated, and also on the lines going west, will you answer the questions which I now ask you?

Mr. Wahrenbrock: Mr. Examiner, I object to the assumption as put. This is not proved yet. It is based upon statements.

[*2472*] Trial Examiner: Well, can't you put a hypothetical question without including an assumption in it? It seems to me that if what you are attempting to arrive at is a hypothetical question to Dr. Slepian, an expert, it can be done without reference to any assumption of a particular state of facts having existed over a particular time.

Mr. Branch: Well, sir, may I say this: All of the testimony of Mr. Miller, I think, and also Mr. Thomas, was based on the same assumption. I don't see why I haven't the same right to go ahead on the assumptions that they went ahead on. There was no specific testimony that I recall in their testimony as to that, other than this in the testimony of Mr. Miller, I believe, which I will ask the witness to consider. I am giving this in substance, and not word for word. This is on page 1147, speaking of the Hartford-Agawam lines at the South Meadow station:

> "Two meters are placed on each line, so arranged by means of mechanical ratchets that one will integrate the flow in one direction, but whose register will not operate when the flow is reversed. The other meter will integrate the energy flow in the direction opposite to that causing the first to register and will not register while the first is registering.

"In case of the Hartford-Agawam line, one meter integrates the flow from Massachusetts to Connecticut and the other meter integrates the flow from Connecticut to Massachusetts."

[2473] He also says:

"A ratchet meter for each direction of flow is provided for each of the three lines connecting the Hartford Electric Light Company to the South Meadow substation. Separate ratchet meters for each direction of flow were provided to show the flow of energy between the South Meadow substation and the C.P. 1 and C.P. 2 lines. All of these meters were read hourly and the readings recorded in a station log sheet by an employee."

I will ask you to assume that there were ratchet meters in the locations which he described, and which recorded flow in each direction. Is that clear to you, sir? *A* Yes, it is.

Q Is that substantially the situation which you found to exist at the present time? *A* Subject to the change of one line from 66 k.v. to 110 k.v.

Q Assuming that to be the situation, during any period in which generators in Connecticut electrically connected with Bristol generated more than the load at Bristol, is it in your opinion possible to show conclusively that Bristol was supplied with any energy generated outside of Connecticut? *A* In my opinion, no.

Q Will you explain? *A* It is not possible by any physical means to distinguish [2474] electrical energy as to source. There is complete lack of identifiable individuality to electrical energy, so that there is absolutely no physical test which can be made which will determine that the energy received at Bristol is the same as that generated in Massachusetts or any other point. If the energy generation at Hartford is more than sufficient to supply the load at Bristol, one may allocate this energy generated at Hartford to the load at Bristol without in any way violating any of the principles underlying electrical engineering.

Q Would your answer be the same if readings made from ratcheted watt-meters, showing the direction and extent of flow in each direction in the lines at the South Meadow substation indicated that there was no flow from the Hartford steam plant to The Connecticut Power lines during the period in question? *A* My answer is the same.

Q Will you explain? *A* In making that answer, I recognize that the interpretation of the readings of watt-hour meters and ratchet watt-hour meters as indicating actual energy flows and lines is a postulate or hypothesis, the validity of which is substantiated only by the fact that this postulate leads to correct totals when all the electric energy generated at a given plant or consumed at a given load is computed.

[2475] Other energy flows may be postulated which equally well satisfy this condition. We may postulate that energy flows from the Hartford plant to Bristol and provided we make other energy flows in the same system take care of the other generation in other loads, there will be no contradiction with any physically verifiable fact.

* * * * * * [2476]

Q At any time in which a load or loads of The Connecticut Light and Power Company on the CP lines No. 1 and No. 2, aggregate a smaller number of kilowatt hours than the total amount of kilowatt hours generated at plants in Connecticut electrically connected with those loads, is it possible to demonstrate that any of the loads were supplied in whole or in part by energy from outside of Connecticut?

Mr. Wahrenbrock: Mr. Examiner, I object to that question. No basis whatever has been laid to show the witness's knowledge of these loads of the Connecticut Light and Power Company connected to the CP1 and CP2 lines.

Mr. Branch: Well, it is a general question.

Trial Examiner: I think it is sufficiently general that the witness may answer.

The Witness: No, it is not possible by any physically verifiable means. This is so regardless of whether generators in Massachusetts connected with the lines are or are not supplying power, and this is so regardless of the watt-hour meter readings in lines coming to and from the South Meadow bus.

By Mr. Branch: *Q* You have said in effect that it is impossible to verify such conclusions by any physical means. Are there any other means of demonstrating this which you would regard as [*2477*] scientifically satisfactory? *A* It would certainly not be satisfactory to me.

Q Is it a matter of common and accepted engineering practice to detect the flow of electrical energy between a source of supply and a load? *A* The flow of current in the line may be detected and measured. We may also detect and measure the difference of potential between the line and the ground. We may use instruments called watt meters to measure the average product of these two directly observable quantities. We may call the readings of this instrument or product an energy flow, but in doing this last we are making an hypothesis which is purely hypothesis, and has no further physical basis. When properly used, this hypothesis leads to correct results, and in the usual operation of power systems, this hypothesis is correctly used. When this hypothesis is used to determine source of energy consumed at a given load, this hypothesis is being used incorrectly, but so far as I know such use of this hypothesis is not made customarily in the operation of power systems.

Q Now, I am going to read you a statement and ask you whether you agree with it. This comes from the testimony of Mr. Thomas, volume 10, on page 1286:

> "Where electric currents or electric energy coming from two sources enter a conductor at a certain point and traverse the conductor to some further point, the usual working concept or [*2478*] hypothesis is that the two currents mix and commingle in an intimate way, and that any portions of the

mixed current drawn off from the conductor at various later points will have about the same proportions of the two component currents as was contained at the point of mixing. This is not based on tagging individual current flows, but on the common fact analogy with the mixing of streams of any kind in a long and narrow passage."

Do you agree with that statement?

Mr. Wahrenbrock: Mr. Examiner, may I pause to make a slight interjection here? "Common fact analogy" is obviously a typographical error, for it should be "common sense analogy".

Mr. Branch: I will correct it. Did I read it correctly?

Mr. Wahrenbrock: Yes, but I think that is obviously a mistake.

Mr. Branch: I will change the last sentence to read: "This is not based on tagging individual current flows, but on the common sense analogy with the mixing of streams of any kind in a long and narrow passage." Now, I am asking you whether you agree with the whole statement which consisted not only of the sentence which I have just repeated, but the other longer sentence. *A* So far as I can give any meaning to the statement, I do not agree with it.

Q Will you explain? [*2479*] *A* To begin with, this statement begins with flow of energy from generators, and then concludes with the discussion of flow of current. Now, electrical energy is not identical with electrical current. It is clear that the statement begins with one electrical quantity and becomes diverted into another electrical quantity, with some resulting confusion—to me, at least.

Q In your opinion, is there any scientific basis for concluding that if two generating plants are connected with an electric system the loads that are also connected with this system receive electrical energy from the two sources in the same proportion as the proportions of generation? *A* No. There is no possibility of determining the origin of any part of the energy received by any particular load.

Q Is it known what happens to electric energy which is generated by two separate generators attached to the same electrical system? *A* Yes. That energy will be consumed at loads somewheres.

Q Is anything more known as to what happens to the energy from the two sources in the meantime? *A* In my opinion, nothing is known, and my opinion is that no answer will be found.

Q Is it a recognized principle in electrical engineer- [*2480*] ing that neither current nor energy can flow physically in both directions in the same conductor at the same time? *A* I answer that question no, but would want to add some discussion to clarify the matter.

Q Will you clarify your answer? *A* Concerning the flow of current in opposite directions in a conductor, if it is meant a practical conductor of finite section, then I can say that there practically always is current flowing in opposite directions simultaneously. In the passage of alternating current through a conductor, as in a practical transmission line, the current flowing in the center of a conductor is slightly out of phase with the current flowing near the surface so that each cycle the current in the center will be flowing in the opposite direction to the current outside.

Q In ordinary electric systems, such as that of which the CP lines 1 and 2 are a part, is alternating current used? *A* Yes. Alternating current is the current commonly used in electrical power systems.

Q Will you continue with your explanation from where I interrupted you. *A* Now, if we ask as to the current flow in a conductor of extremely small section, or what comes to the same thing, the current flow in an infinitesimal part of a large conductor, I would say that there is a single net or total current having [*2481*] a unique direction which can be detected and measured. However, it is common practice for various purposes to regard such single current as made up of component currents and these component currents may flow in opposite directions. I can give many examples of such practice.

Q Will you give such examples. *A* In the usual treatment of transformers, it is common to regard—

* * * * * *

The Witness: In the usual treatment of transformers, it is common to regard the current flowing in the primary winding as made up of two parts—the exciting current or the current that would flow in the primary if the secondary were open-circuited and the load current or the additional current which flows in the primary in virtue of load being connected to secondary. These two components into which the primary current is resolved are usually out of phase so that part of each cycle they are flowing in opposite directions.

Another example is the common resolution of the current flowing in a conductor into a portion which is in phase with the voltage and a portion or component which is 90 degrees out of phase with the voltage. Again we have with this resolution into components the two components flowing in opposite directions [*2482*] twice per cycle. In dealing with waves on transmission lines it is common practice to regard the actual state of the transmission line as due to the simultaneous flowing of waves in both directions. The currents accompanying these waves are generally flowing in opposite directions at the same points in conductors.

In the armatures of rotary converters commonly used for supplying street railway systems the current in the coils is commonly resolved into so-called direct current and alternating current components and these currents against will flow in opposite directions a good deal of the time. So much for current flow.

Q Will you now explain your answer as respect to the possibility of energy flowing physically in both directions in the same conductor at the same time? *A* I have to begin by denying any physical meaning to the energy flow in conductors. The energy flow in the conductor is a pure postulate unverifiable by any physical means—a postulate that has utility in that it leads to the correct answers to certain types of questions. A common form of

energy flow postulate is that the energy flowing in the conductor is given by watt-meter reading connected to that conductor. However, many other perfectly valid postulate as to energy flowing in the conductor which will give physically verifiable results for any situation for which an [*2483*] answer are possible. There is therefore absolutely no reason why simultaneous energy flowing in opposite directions may not be postulated at the conductor provided the total system of flow postulated meets the condition, which I believe I have stated before, of correctly giving the total energy consumed at each load and the total energy generated at each generating station. There is no principle in physics or electrical engineering which will limit the flow we may postulate other than the one I have stated and therefore we may freely use postulated flows going simultaneously in opposite directions in a conductor if we so choose.

Q Can you give any example of energy flowing simultaneously in the same conductor in the same direction? *A* As I have said, the energy flow is purely postulate. I can set up—

Q Excuse me just a minute. I may have made a mistake.

* * * * * *

Mr. Branch: I should have said in opposite directions.

The Witness: As I have said, the energy flow is purely postulate. I can set up electrical systems, which I can proceed to do now. Let us suppose we have a generator A at one end of a line and a generator B at the other end of the line. Let us say we have load C near the first end of the line and [*2484*] load D near the second end of the line. For definiteness, let us say that each generator is generating 10,000 kilowatts and each load is consuming 10,000 kilowatts. Now, I may choose to say there is an energy flow from generator A to load D of 10,000 kilowatts along the line and at the same time an energy flow of 10,000 kilowatts from generator B to load C along the line. This description of energy flow is entirely compatible with the only verifiable or observable fact that A and B are each generating 10,000 kilowatts—C and D

are each consuming 10,000 kilowatts. This hypothesis that generator A is supplying the load D by energy flow along the line and generator B is supplying load C by energy flowing along the line requires that energy flow simultaneously in opposite directions along the line, but such implication in no way contradicts any principle of electrical engineering or any observable fact. It is, therefore, a valid hypothesis to assume such a flow exists. I can give another example.

If we will consider the reactive volt amperes which may be regarded as a kind of energy flow similar to the average volt ampere reading of a watt-meter, it is sometimes practice to place in the line simultaneously a watt-meter, and a reactive volt ampere meter. The watt-meter reading, according to the frequently used hypothesis indicates an energy flow in one direction. We may have simultaneously reactive volt amperes indicating some kind of energy flow in either [*2485*] direction, so that one of these directions might be said to be opposite to that of watt-meter indication.

Q Is there anything in the views which you have expressed, or the views which you have postulated, not only in answer to this last question, but in answer to the rest of your questions, which would invalidate the results that are commonly obtained in commercial practice from the use of watt-hour meters? *A* So far as I know, no.

Q As far as you know, has there ever been occasion, except possibly in connection with investigations of the Federal Power Commission in recent years, to attempt to trace the flow of energy from different sources to a load where two generating plants are connected with the same electrical system? *A* No.

Q It has been suggested that the current flow in a conductor might be considered to consist of the simultaneous flow of two or more components in opposite directions. If this were so, would not the loss occurring in the line be considerably greater than the loss actually observed? *A* No. The heating of the conductor is determined by the total or net current flowing in it and is not

affected by the number of components in which you choose to resolve your actual net current.

Q What have you to say as to the following explanation [*2486*] of the contention that current cannot flow in a single circuit in both directions simultaneously? I quote: "For example, if we had one ampere going one way in a circuit and 2 amperes going the other way, if you can imagine such a thing, we would at least have the energy loss in resistance in one, due the current of 1 and energy lost in that same conductor due to the flow of the other, due to the current of 2, making a total, we will say of 5, whereas the actual fact occurs"—that should be 3 instead of 5—"whereas the actual fact occurs that we have only the different"—the energy loss of 1. "That would be a physical thing you can measure, and by experience you would know that the loss you measured couldn't be due to two currents flowing at the same time in the same wire."

* * * * * * [*2487*]

Q Mr. Slepian, I am going to ask you to follow this statement, and then comment upon it. The statement was given as an explanation in support of the contention that current [*2488*] cannot flow in a single conductor in both directions simultaneously.

This is the statement:

> "If we had one ampere going one way in a circuit and two amperes going the other way, if you can imagine such a thing, we would at least have the energy loss in resistance in one due to the current of one and energy loss in that same conductor due to the flow of the other, due to the current of two, making a total, we will say, of five, whereas the actual fact occurs we have only the difference flowing of one and the energy loss of one. That would be a physical thing you can measure, and by experience you would know that the loss you measured couldn't be due to two currents flowing at the same time in the same wire."

First of all, do you understand that statement?

Trial Examiner: Do I understand that one and two and five?

Mr. Branch: I asked Mr. Thomas through Mr. Wahrenbrock if he would make any corrections, and as that was not changed, I understand that it is correct.

Mr. Wahrenbrock: I have indicated to you two corrections and I think you gave effect to them in your reading.

Trial Examiner: All right.

By Mr. Branch: *Q* Mr. Slepian, what have you to say as to that explanation [*2489*] of that contention? *A* There is no reason why the heating effect of two currents flowing simultaneously in the conductor should be the sum of the heating effects which would be produced if each current flowed by itself. Therefore, there is no contradiction if the heating effect of two currents flowing simultaneously is less than the sum of the heating effect which each would produce individually. The actual heating effect will always be determined by the total or net current and the losses in the transmission line are due to this heating effect almost entirely.

Q Will you give a further explanation of your view that usage of watt-meter readings as indications of energy flow in conductors is a postulate which cannot conclusively determine the origin of electrical energy for any particular load? *A* Well, you can easily create situations where the use of such postulate will lead to obviously ridiculous results. For example, we may make an electrical system where watt-meters will indicate more energy than is being supplied to the system. Consider a transformer with one terminal grounded and the other terminal at 10,000 volts. If one ampere flows in this terminal line and at 100 per cent power factor, a watt-meter placed in this line will indicate 10,000 watts.

[*2490*] Suppose that this transformer has a tap which is 9,900 volts above ground or 100 volts from the high end of the transformer, and suppose a line to come from this tap. If one ampere flows from this line, a watt-meter placed in the line will indicate plus or minus 9,900 watts, depending upon the direction of the current.

Suppose now a resistor of 100 ohms is placed across the two lines in question. With the transformer energized, one ampere will flow out from the transformer in the high line through the resistor and back through the 9,900 volt line. The watt-meter in the high line will read 10,000 watts. The watt-meter in the tap-line will read minus 9,900 watts. The sum-total of the watt-meter readings gives correctly the 100 watts consumed by the resistor. The watt-meters used in this way give correct results, namely, the total of their readings gives correctly the power consumed by the load. On the other hand a watt-meter connected in the supply lines of the transformer would read only 100 watts, if we neglect the losses in the transformer.

Now, suppose that the supply lines of the transformer come from a generating station in Massachusetts. The transformer itself is in Connecticut. What is the origin of the electrical energy in the 10,000 volt line? Is it Massachusetts? According to the watt-meter, Massachusetts only sends 100 watts.

[*2491*] In the 10,000 volt line by watt-meter there are 10,000 watts. What is the origin of the 9,900 watts in the tap line? Does not it come from the resistor and go back to Massachusetts?

I believe that these questions reveal the ridiculous position in which one may be placed if one assigns to unique and literal a meaning to the energy flow that is said to exist in lines by the watt-meter postulate. If the watt-meter postulate is only used for totalizing energy consumption or generation, it will give correct results. If used for other purposes it may lead to ridiculous or at least non-uniquely determinable results.

* * * * * * [*2493*]

The Witness: Well, a particular hypothesis may lead to a correct result, directly determinable, and may also lead to other conclusions. An alternative hypothesis may lead to the same verifiable result, but with respect to other conclusions may differ with the first hypothesis. Now, if there is absolutely no way of checking these hypotheses except on the points on which they agree,

then it is clear that the statements with respect to which they disagree are non-uniquely verifiable; that is, you may have more than one hypothesis which are equally good as far as anything verifiable is concerned, but they disagree on a particular point.

Trial Examiner: In other words, it can't be positively demonstrated, is that your meaning of non-uniquely verifiable?

The Witness: Well, I mean a little more than that. The best example I can give is the case of power flow. I can write many systems of power flow which will be correct as far as anything that you can determine goes. It will correctly take energy of the right amount from any particular generating system I am considering, and bring the correct [*2494*] amount to the observed load. But they will give wholly different conclusions as to which generating system is supplying which load. Now, if you want to take the stand that either hypotheses is correct, or that both are correct, then you have to say they lead to conclusions that are not uniquely determinable. One hypothesis will say one thing about the origin of power, and the other will say another thing about the origin of power, and they are equally valid, but we in our ignorance do not know which is correct. The simple state of affairs is such that with all the information it is ever going to be possible for us to obtain, nobody is ever going to answer the question in a unique way as to which load the power from a particular station goes to.

Trial Examiner: I think I understand that situation now very clearly.

Mr. Branch: I thank you for asking the question.

By Mr. Branch: *Q* Mr. Slepian, have you drawn a diagram to illustrate the matter which you referred to in the long answer which you recently gave to a question of mine? *A* Yes, I have.

Q Will you hand it to me?

(Document handed to counsel.)

Mr. Branch: I ask that this diagram—

By Mr. Branch: [*2495*] *Q* Maybe you will put your name on it

so that it will be something to identify it by. And can you suggest a title for it at the top?

Trial Examiner: I hope it isn't necessary to state the answer at the top.

Mr. Branch: This diagram Dr. Slepian has signed, and he has also entitled it, "Energy flow in tap transformer."

I ask that this sheet be marked Exhibit 81 for Identification.

Trial Examiner: There being no objection, it will be so marked.

* * * * * * [2508]

Cross Examination by Mr. WAHRENBROCK.

Q Will you explain what an electric current is, taking up, if you will, first the direct current? *A* An electric current is observed through the effect it produces. The commonly used effect is the magnetic effect or the action of current in a conductor upon neighboring iron or upon other conductors carrying current, mechanical actions.

Q I didn't understand you. Iron, did you say? *A* The action of current in a conductor upon neighboring iron or upon neighboring conductors also carrying currents. These actions are made use of in ammeters to measure current in a conductor, so that in a practical sense we say that a current is flowing in a conductor if a well understood instrument, the ammeter, connected to that conductor, gives an indication.

Mr. Branch: May I have that answer read? It is a little difficult to hear.

[2509] Trial Examiner: All right. Now, read the answer back.

(Answer read by the reporter.)

By Mr. Wahrenbrock: *Q* What is your conception of what is happening in the conductor at the time that kind of influence on neighboring iron or neighboring conductors is observed? *A* You want, I presume now, for me to give you my picture of the constitution of the conductor and the alteration that is taking place in its constitution when it is carrying current?

Q Yes. *A* I may be allowed at this moment, however, to state that that question is entirely irrelevant for such purpose that we have been discussing. The particular picture that you may have of the interior of a conductor has changed in the past 100 years quite radically, and yet the theory of the flow of currents in conductors, as established by Maxwell and those who preceded him, has not changed essentially. So that the answer which I give now as to my understanding of the nature of the processes that go on in the conductor, as I see it, has no particular bearing upon the testimony which I have previously given. However, my understanding of the nature of the metallic conductor is this: The conductor itself is made up of large numbers of in-[*2510*] dividual atoms, spaced rather rigidly from one another. As part of these atoms there are so-called electrons. These electrons do not behave like ordinary physical objects, but have laws of motion peculiar to themselves, and rather different from the laws of motion of ordinary macroscopic material objects. Now, the generally accepted picture, accepted by physicists, is that some of the electrons in the metal are capable of rather free motion and under ordinary circumstances these relatively free electrons do move about with rather large velocities and in random directions, so that in any one moment in a conductor you will find large numbers of electrons going in all directions.

Q Without interrupting your explanation, may I ask whether, when you speak of these electrons moving about at random, do you mean within a limitation with respect to the atom, or without respect to any limitation in respect to the atom? *A* These free electrons do move over distances large compared to the distance between atoms, that is, they move relatively large distances, ten or more atomic spaces at a time.

[*2511*] *Q* Are they associated with atoms?

* * * * * *

The Witness: These relatively free electrons move about over larger distances, these distances being ten or more atomic spaces, at random, and with rather high velocities.

Now, under ordinary conditions, when the conductor is in equilibrium, there are on the average just as many electrons moving in one direction as in the other direction. That is, the net flow of electrons in any direction is zero. Now, when a current is flowing in the conductor, there is a relatively small excess of electrons flowing in one direction over that [*2512*] flowing in the opposite direction, and the necessary transfer of electrons in the particular direction is said to constitute the electric current. That is, the actual observed current, observed through the effects which I have previously mentioned are believed by physicists to be the resultant of very much larger motions in the conductor of electrons in opposite directions. The motions in the two directions not balancing, giving an excess which is observed as the electric current.

Q Now, in that connection, what is your conception of an electro-motive force? *A* In the literature the word "electro-motive force" has been given two meanings, and I am not sure which meaning you are asking me to explain. I believe that in Maxwell you will find the electro-motive force is simply defined as the interval of the electric force from one point to another. That would be in a battery, for example, open circuited, there will be an external electric field, and if you integrate the electric force from the one battery terminal to the other battery terminal, that quantity will be said to be the electro-motive force between the two terminals. Now, the other meaning which has been commonly used, would be the integral of the forces acting upon charged particles, electrons, for example, which are not electromagnetic in character. That is, so-called impressed electric forces. [*2513*] Such a force might come about for example when two dissimilar metals are put in contact. There is then a contact difference of potential or electro-motive force between these two metals, and that particular electro-motive force arises from the greater attraction of the one metal for electrons than the other. Or, another example of such electro-motive force would be in the battery, the forces of a chemical character which cause separation

of charges. That is, they might be concentration gradients in the electrolite, or they could be specifically chemical activities in the electrolite. The electro-motive force in the first sense which I defined around any closed circuit is zero in electrostatic cases, in cases where the currents and voltages, and so forth, are not alternating. It is the electro-motive force defined the second way which is not zero, when integrated around a closed circuit, it is not zero, and it is responsible for the current flowing in a closed circuit in the electrostatic case.

Q Now, how does the electro-motive force affect the movement of electrons which you have previously referred to in discussing currents, or what is its relation to the movement of electrons which you have discussed as currents? *A* In a simple conductor, all at one temperature, of a uniform material, the motion of the electrons statistically is determined by the electric intensity, or electric field inside that conductor. That is, the excess of motion of [*2514*] electrons in the direction of the electric field, over that of the motion of electrons opposite to the electric field, is proportional to the electric field and the constant of proportionality is a property of the material directly related to what we ordinarily called the resistivity of the material. If the material is not uniform, or not at one temperature, then the relationship is not so simple. We then have—we may have an electric field then with no current, or we may have a current with no electric field. And I can develop that further if you like, but it is only in the simple case, where the material is uniform in nature, and at one temperature, that we have the simple relationship between the electric field and the net current that I have just given you.

Q Does that mean that in your simple case which you have cited, the presence of an electro-motive force means that the electrons move differently than they would otherwise? *A* I do not say electro-motive force. I said electric field. The electrons in the electric field have their motions slightly altered, according to the concepts of physicists.

[*2515*] *Q* I am not sure that I understand the qualification

which you introduced in your last answer when you qualified your preceding answer as not relating to electromotive force. I thought that I had asked in the preceding question about an electromotive force. Can you clear up my misunderstanding in that connection? *A* Are you asking for the difference between electromotive force and electric field?

Q If that will explain your previous answer, which I understand now was addressed to an electrostatic field rather than to electromotive force? *A* Yes. The electromotive force, according to either of the definitions which I gave before, the electromotive force obtained by integrating some particular force, say the electric field from one point to another. Now, the behavior of the electrons in a metal at a particular point depends only upon the state of affairs at that particular point, and the state of affairs at that particular point is given by the electric field at that point and is not determined by the things that happen remote from that point. So that, if you ask as to what is happening to electrons at a particular point, you must use terms that apply only to that point and not to remote points, so that the proper term to use there is the electric field which is defined at that point rather than electromotive force which necessarily involves [*2516*] the electric field over a large region, including much more than the particular portion and space about which we are discussing and at which we are discussing the motion of electrons.

Q What does an engineer mean when he refers to electromotive force? *A* Well, I am described as an electrical engineer, so that the answer that I have just given, at least is the answer of one electrical engineer. If you will tell me what you mean by an electrical engineer, perhaps I will try and answer your question.

Q Which of two meanings of electromotive force to which you have referred is the common meaning in engineering parlance? *A* I believe the second definition is more widely used among engineers.

Q Is it common to speak of current as being produced by an electromotive force? *A* Yes, in loose language, yes.

Q Is such a statement commonly made by engineers and in engineering texts? *A* Ordinarily conversation is carried on to transmit information from one person to another, with the intention of each party to get at some common understanding or truth, and it is not necessary to use great care in defining terms, because [*2517*] as soon as it is clear that the greater care is necessary such care will be taken, so that I think, in ordinary language, engineers talking among themselves will use terms loosely, but undertake to define them more precisely as they need to. Now, ordinarily, I suppose, engineers would accept the statement that an electromotive force produces a current, without dissecting it, because he knows that if any questions arise that need further elaboration, that he will be permitted to make a more precise statement than that electromotive force produces current.

Q What is commonly meant by that statement, that electromotive force produces current? *A* Well, I think all that the electrical engineer means is that he may have a circuit in which there is both current and electromotive force and that there will be some relationship between them.

Q Now, will you explain what your conception is of the factors which determine the distribution of current through the cross-section of a conductor, and my question relates now to alternating current? *A* At each point in such a conductor the current density is given by the electric field at that point.

Q And when you say "point" in a conductor, are you referring to a point in the cross-section of the conductor? *A* A point in the cross-section, so that the current [*2518*] density at the center of the conductor is given by the electric density or the electric field at the center, multiplied by the conductivity of the material at that point.

Q Multiplied by what? *A* By the conductivity, the reciprocal of resistivity. The current density at the periphery is given by the electric field at the periphery, multiplied by the resistivity of the material there. Now, in my previous statement I said that the current density at the center was different in phase from the cur-

rent density at the outside at the periphery, so therefore you may conclude then that I also implied that the electric field at the center was different than the field at the periphery. Now, the electric field may be calculated from the distribution of electric charges and from the distribution of magnetic fields which may be varying in time. The particular situation of the conductor carrying current, the reason for the electric field at the center of the conductor being different from that at the periphery, is to be attributed to the magnetic, the varying magnetic, field produced by the current which is circulating in the conductor.

Q I wish you would consider the hypothetical situation in which gases from two sources are introduced into a relatively long pipe of relatively small diameter, such as a common gas transmission line. The gas from one source— [*2519*] *A* May I interrupt? Will you repeat that? Just the last question?

(The question is read.)

Q (Continuing.) The gas from one source has mixed with it some smoke and that from the other source has not. Would you expect the gases from those two sources which are emitted from the distant end of that pipe would be mixed? *A* Under ordinary conditions we would say they would be mixed.

Q Well, now, what is the effect of the qualification, under what extraordinary conditions would they not be mixed? *A* The gas was not specified. If the gases were extremely low temperature, for example, the mixing might be negligible.

Q You have in mind a theoretical zero? *A* No, a practical temperature of say one degree absolute.

Q It wouldn't be a gas at that temperature, would it? *A* Helium would.

Q Helium would? Those are the extraordinary circumstances to which you referred? *A* Well, you asked me a question as to whether the gases would be mixed or not. I said ordinarily they would be, and then you asked me further under what circumstances they would not be, and I gave you one circumstance when they would not be mixed.

Q Now, under ordinary circumstances then, with that under- [2520] standing, I believe you would expect that the gases would be mixed when they are emitted from the far end of the pipe, is that true? *A* Yes.

Q I understand that you don't believe that when electric current from two sources is supplied to the same conductor, a conductor of relatively small cross-section and relatively long length, that the current at the far end of the conductor is mixed? Am I right in that understanding? *A* I might say that we would need a little clearer understanding of what you mean by the currents being mixed. In a given conductor carrying current, as I have said before, the electrons on the electron basis, the electrons are moving in quite random directions, and how you are going to attach an ownership of a particular electron to one circuit or the other circuit, I don't know. I don't know what it means, but of course you are not talking about mixing of electrons, you are talking about mixing of currents, which is a statistical average of many electric currents. Now, what in the world you mean by mixing of currents, which is a statistical average of tens of millions of electrons moving in complicated ways per cubic centimeter in a metal, I don't know. If you will define the meaning of the word "mixing" in such a way that I will understand it in some physical way, so that I can, after you tell me what you [2521] mean by "the current being mixed" devise some test that will enable me to answer your question, then I will attempt to answer your question.

Q Well, where a current then is supplied to a conductor from two sources, if we look at the point where the two conductors come together into a single conductor, would it be proper to say that the current in each source is the statistical average of the electrons in that conductor at that point? *A* At each point in the conductor the current is the statistical average of the motion of the electrons. At each point in the conductor, I said nothing about source. I don't know what you mean by saying "in each source".

Q Then, beyond the point at which two conductors each carrying a current are joined, the current is likewise, at any particular point, the statistical average of the— *A* Motion—

Q —of the action of the electrons at that point? *A* At that point, yes, at this different point.

* * * * * * [2522]

Q When on your direct testimony, you gave the example of a generator at A generating during a given period of time 10,000 kilowatt hours, connected to a line at the extreme end of which is another generator, B, generating during the same period of time 10,000 kilowatt hours, with a load C near the A generator taking 10,000 kilowatt hours during the same period of time, and a load D near the B generator, taking during the same period of time 10,000 kilowatt hours, I believe I understood you to say that so far as physically verifiable or observable facts were concerned, it was reasonable to assume that generator A was supplying load D, and generator B was supplying load C; is that correct? *A* By reasonable, you mean it is just as permissible to use that picture as any other?

Q Is the latter what you meant to say, that it was just as permissible to make that assumption as any other assumption? *A* I am not able to know what I meant to say unless I have my answer read.

Q Well, without referring to what you meant to say, [2523] what is the fact, in your opinion?

Q Will you state the question now as a question?

* * * * * *

A As far as I remember, I did not use the word "reasonable" in the answer to that question.

Q Would it be just as reasonable to make that assumption as any other assumption? *A* In the absence of any motive for choosing one over the other, I would say it was just as reasonable.

Q Just as reasonable to assume that A supplies D, and B sup-

plies C, as to assume that A supplies C, and B supplies D? *A* Absolutely.

Q And in such a case, would you say that there was any measurable transmission losses? *A* Would you repeat the question, the last question again?

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: In which case, please?

By Mr. Wahrenbrock: In the case of your assumption that A supplies D, and B supplies C?

A There would always be losses associated with the generation of energy at the two generators A and B, and the [*2524*] consumption of energy at the two loads, C and D. In other words, the total of energy generated at the two generators would exceed that consumed at the loads.

Q Would there be any measurable transmission loss with respect to the transmission of electric energy between points C and D? *A* If by transmission losses you mean losses in the conductor in the line joining A and B, C and D, the losses in the case that I have just been considering would be very small, practically zero.

Q Would there be any difference in the transmission loss, assuming A to supply D, and B to supply C, from the transmission loss assuming A to supply C, and B to supply D? *A* The assumption made as to which generators supply which loads have nothing to do with the losses.

Q Then do I understand that there would be no measurable difference in transmission loss if A supplied D and B supplied C, any different from the transmission loss if A supplies C and B supplies D? *A* I have tried to explain that there is no possible way of determining whether A supplies C and B supplies D or A supplies D and B supplies C; so that, saying that A supplies B or A supplies C and B supplies C or B supplies D, saying that, has nothing to do with the condition of currents which are responsible for the heating or the distribution of voltages which will be [*2525*] responsible for dielectric losses, and so on.

Q If, as a matter of fact, it was physically verifiable that A did supply D and B did supply C, the transmission loss would be no more than would be the fact if it could be physically verified that A supplies C and B supplies D. Is that true?

* * * * * * [2526]

A I have stated that because of the very nature of electrical energy it will be impossible to verify that energy from A goes to C rather than to D. Your question is equivalent to asking me, "If two and two made five, how much would three and four be?" In the nature of things two and two can't make five, and therefore I cannot answer the question.

By Mr. Wahrenbrock: *Q* Do I understand you to say that A can't supply B and B can't supply D? *A* I say that you can assign the energy from A and B to C and D as you please. So far as any physically verifiable facts are concerned, all that we know is that the total generated by A and B equals the total consumed by C and D, allowing for certain losses.

Q I want to add one more assumption to the case we have been discussing, which was the case you first put on direct, and that is, assume that between C and D in the line the circuit can be opened. Will there be any difference in the observable transmission losses during the same period of time and under the same conditions, with the switch open as with the switch closed? *A* Well, in a practical case there would be a slight difference. The two stations are held together by the line, and currents must flow holding them together.

[2527] *Q* The difference, then, is the synchronizing current in the transmission line between C and D? *A* Yes, you can describe it so.

Q And so far as any assumed flow of energy between the points C and D is concerned, there is no measurable transmission loss? *A* The loss in the conductor is determined by the current in it, and has nothing to do with the assumed energies on the conductor.

Q I am not sure that I understand your answers to the preceding

line of questions, and I would like to see if I can clarify my understanding by this variation of your problem. I believe that you assumed and in my questions I have assumed that the load C is near the generator A, and the load D is near the generator B. I wish to assume that the load C is at the generator A and the load D is at the generator B. On that assumption, if the generator A and the load D are eliminated, will the transmission loss in generator B serving load C be determinable? *A* The loss in the conductor will be determined by the current in the conductor.

Q And under the circumstances given, it would be determined? *A* Not merely from the kilowatt-hours.

[2528] *Q* What more would you need? *A* I would need to know the voltage principally, and also the phase angle between current and voltage. I would then, of course have to know the size of the conductor, and so forth.

[2529] *Q* All right. I just want to get those factors that need to be known. You would need to know the voltage? *A* Yes.

Q You need to know the phase? *A* From the kilowatts, to derive the current, assuming that there is nothing extraordinary about the system, I would need to know the voltage and the power factor.

Q Voltage and power factor, and the size of conductor. *A* Then to determine the resistivity of the conductor, I need to know its size and material, and so forth.

Q Now, knowing those facts, you could determine the transmission line loss? *A* I would be able to approximately calculate the heating of this transmission line.

Q And assuming that from those facts you made the determination: Now, assuming that those factors remain constant, but it is the other generator and the other load, the other generator operating and the other load is being supplied, and the load we have just been considering is not being supplied, and the generator we have just been considering is not operating, would the transmission loss be the same?

* * * * * * [2530]

The Witness: The loss in the line would be approximately the same.

By Mr. Wahrenbrock: *Q* Why do you introduce the qualification "approximately"? *A* Well, to be on the safe side.

Q Well, do you have any factors in mind which would make it not exactly equal? *A* Yes. The distribution of potential along the line wouldn't be constant. The capacity effects have to be taken into account and—

Q Would that be any different if a load at one end is being supplied from the other end, and if the load at the second end is being supplied from the first end, voltage, kilowatts and power factor, conductor size, and attendant circumstances remaining constant? *A* If the system is completely symmetrical in every way, it would be. But you failed to state it was symmetrical. You said the same system.

Trial Examiner: May I just ask what the witness means by symmetrical?

The Witness: Well, you require the transmission line at each end, at any one point, to be exactly identical with the [2531] construction of the transmission line at a symmetrical similar point. That is, take any one point on the line near the generator A, you must have a similar construction, similar height of lines, and so forth, at a corresponding point, a similar distance, from Station B. And that kind of symmetry is to extend throughout the system. If the line goes over a mountain near A, it must go over a mountain near B.

Trial Examiner: That clarifies it very well.

By Mr. Wahrenbrock: *Q* Now, continuing to put a third situation, where both generators are operating, and both loads are being supplied simultaneously, would the transmission line loss be the same as in each of the preceding cases? *A* The loss on the transmission line in that case would not be the same as that in each of the two cases we have just been discussing.

Q Would it be greater or smaller? *A* The losses in the line would be smaller.

Q Relatively how much smaller? *A* It would be very considerably smaller.

* * * * * * [2532]

Q I would like now to take this hypothetical and ideal situation, and relate it in terms that we can understand something about the distances involved. I would still like to make the same assumptions about the amount of the two loads, and the amount of the two generators, the amount of the two generators each are generating, but I wish to assume that generator A is a steam generating plant in Nashville, Tennessee, and generator B is a steam generating plant in Mobile, Alabama; load C is the utility load in Nashville, and D is the utility load in Mobile. Now, do I understand you to say that in your opinion it is as reasonable in the facts you stated in your hypothetical case to assume that the Nashville load is supplied from the Mobile generating plant, and the Mobile load is supplied from the Nashville generating plant, as to assume that the load in each city is served by the generator in each city? *A* I don't believe I used the word "reasonable". I said it is permissible, and if you choose to use the one description for a certain purpose to suit your convenience, you may do so, [2533] or you may use the other. They are equally satisfactory descriptions as far as physical tests go.

Q Do you mean it is not as reasonable to make one assumption as the other? *A* No, I do not. Under one set of circumstances you may find it convenient to use one description, and under another set of circumstances you may find it convenient to use the other. It is a matter of convenience, not a question of reasonableness or unreasonableness.

Q Then, if you say you do not say that it is not as reasonable, than you mean to say it is as reasonable? *A* I think I have made clear what I meant to say. Now, if you will ask me a specific question, I will try to answer it.

Q Is it as reasonable to make one assumption as the other? *A* Depending on the purpose you have in making the assumption.

* * * * * * [2535]

Q If for any purpose it becomes important to take certain steps with respect to sources of electric energy generated in one State and consumed at a point outside thereof, would it be necessary, in your opinion, in order to accomplish that result, in the case of interconnected utility systems operating in synchronism, extending over two or more States, with loads in each State and generating plants in each State, to include all of the generating plants in all of the States?

[2536] Mr. Branch: I object to that question. It is too vague.

Trial Examiner: It doesn't seem to me that the question is vague, except as to one point. The expression as to the taking of certain steps, I don't think is material to the question. It seems to be only confusing. I understand simply that if it becomes necessary to know, can it be known. Is that the general idea of the question?

Mr. Wahrenbrock: If the Examiner please, as I understand the witness's testimony, it is that in a case of such an interconnected system, you cannot physically verify which generator supplies which load. In order then to be sure of catching the generator which supplies a particular load, I want to know if you would have to catch all the generators.

Mr. Branch: Well, I don't think this is cross examination of anything that we went into, and I don't know exactly what he means by "catching" generators.

Trial Examiner: I don't think anybody expects him to stand down in front and catch it physically. It seems to me that the question as last stated may be answered. The objection is overruled.

A The principles and laws of electrical engineering upon which I have based all my testimony, make no reference whatsoever to State lines or geographical locations. The statement remains,

that when several generators or sources of electrical energy are connected to a system and several loads, it is im- [2537] possible for any physical means to determine the origin of the energy which any particular load receives, with respect to the various generators, to know which generator supplied which load. When I say that it is impossible, I mean that you can give a thousand different answers and they will all be equally correct, so far as the basic principles of electrical science are concerned, and this is true, regardless of State lines.

By Mr. Wahrenbrock: *Q* Well, then, when you have interconnected utility systems with several loads in several States and several sources of supply of energy in each of the several States, it is your position that it cannot be demonstrated by physical means that any particular source of energy is supplying any particular load? *A* Where there are several sources of supply adequate for supplying that particular load, it is not possible to uniquely affirm that some particular source is supplying that load.

Q And the closest to determination that can be made is that some one or more of the sources of supply, of all the sources of supply, is carrying that particular load? *A* When you say that a load is being fed or supplied by some of the generators in the system, all you can mean is that the total of the energy generated at those sources exceeds that [2538] consumed by the load?

* * * * * *

Q And in an inter-connected utility system operating in synchronism, where there are loads in each of several States and generating plants in each of the several States, the only identification that can be made of the source of any electric energy moving across State lines is that it must come from some one or more of all the generating plants? Is that correct? *A* I only know of energy being consumed or generated, generated at the sources and consumed at the loads. That I can measure.

Q Well, we do know that it gets from one to the other, don't we? *A* We know that it is generated at the one place and con-

sumed at the other. If you mean by that it gets there, then it gets there. All I mean is that it is generated here and consumed there.

Q Well, you are not assuming, are you, that the energy which is consumed at the point of the load is created in the strict sense, at that point, do you? [2539] *A* Well, I only know that we must have the total generation equal to the total consumption.

Q Energy can't be created or destroyed, can it? *A* Total energy generated is equal to total energy consumed. That is all I know. If you want to describe that balance by saying energy cannot be created and destroyed, if that is what you mean, good.

Q Well, do you recognize that there is any such thing as transmission of electric energy? *A* I will tell you what I mean by transmission of electric energy.

Q If that means that you do recognize that there is such a thing as transmission of electric energy— *A* Yes, I recognize transmission of electric energy.

Q What do you mean by transmission of electric energy, which you recognize? *A* The generation of electric energy at one geographical point and its consumption at another geographical point with intervening electrical apparatus, transformers, wires, and so forth.

* * * * * * [2540]

Q Does the presence of transformers in the intervening electrical system make any difference to such transmission of electrical energy? *A* I don't believe I understand the question.

Q Well, I believe in your last answer you mentioned transformers. Now, do I understand that you include those in the system by which electric energy is transmitted from other sources of supply to its loads? *A* Yes, in general, yes.

[2541] *Q* If in an interconnected utility system, operating in synchronism, extending over two or more States, and having in each of the several States loads, and in each of the several States generating plants, it becomes important to ascertain which of the generating plants is the source of electric energy which is transmitted by the intervening system to a particular load, will it be

necessary to include all of the generating plants in order to be sure to include any particular plant or plants which is supplying that load?

* * * * * *

The Witness: The purely technical question is entirely unaffected by the importance to human beings as to what the result is. The important part of it is entirely unimportant, and I don't consider it in my answer, whether it is or is not important.

[2542] I believe I have made clear that it will not be possible to determine the origin of the energy consumed at a particular load as distinguished between several stations, no matter how much you take into account of the system. You can consider the whole system or only part of the system. You won't get any answer that is uniquely correct.

Q All that can be ascertained is that the particular load must be supplied from some one or more of all of the generating plants? *A* You can be sure that the energy consumed at the load, measured by whatever way you like, will be less, at least no greater, than the sum of all the energy generated at the various stations connected with the system, and that is all you will know.

* * * * * * [2543]

Q Do I understand you to say then, or to mean then, that if we do know all of the generating plants in an interconnected utility system, operating in synchronism in several States, with loads in each of the several States, and generating plants in each of the several States, that we can assume that one or more of those generating plants supplies any particular load, and that we can not verify any fact beyond that? *A* Well, I have tried to make my position clear on that. There is no possible way in which you can identify the energy received at the load as to source. You can, if you please, allocate energy from one source to one particular load, as you choose, and so long as you make the sum total of the energy you assign as coming from the various stations balance the energy, the sum total of energy you assign to the

various loads, you will contradict no observable physical facts. If you choose to make one allocation of energy, or more than one allocation of energy, or make no allocation at all, it is entirely at your pleasure.

Trial Examiner: Your answer doesn't depend in any way, does it, on the hypothesis advanced by counsel that there must be a load in each case affecting the source of energy?

The Witness: No. The fact that the described system extends over several States is entirely immaterial.

* * * * * * [2545]

Q I should like to refer again to the earlier illustration which you used in which there is connected to a line a generator at one point, A, supplying 10,000 kilowatt-hours during a given period, and a generator B, at the end of the line supplying simultaneously or during the same period 10,000 kilowatt-hours, and a load C near the generator A, using 10,000 kilowatt-hours during the same period of time, and a load "D" near the generator "B", using during the same period of time 10,000 kilowatt hours, and ask you whether, in what you said about the possibility of generator B supplying all of the load C and generator A supplying all of the load D, you meant to be understood as saying that there ever had been at any time a flow of energy over a conductor and simultaneously a flow of energy over the same conductor in the opposite direction. *A* As I remember, I said that it is quite permissible to postulate or assume an energy flow from the generator A [2546] to Load D, and also an energy flow from generator B to load C; that if you chose to confine those flows that you are postulating to the line, you are free to do so, and if you confine them to the line, why naturally there will be simultaneous postulated flow of power in the two directions along the line.

Q It is permissible to postulate or to assume, but do you say that there ever has been demonstrated flow of energy in one direction and simultaneously over the same conductor, a flow of electric energy in the opposite direction? *A* There has never been proven any flow of energy in the line in any direction.

Q Therefore there never has been demonstrated a simultaneous counterflow of energy? *A* I have repeatedly stated that the flow of energy—

Q Well, can my question be answered yes or no? *A* Is this a new question now?

Q The question I just put, can it be answered yes or no?

Trial Examiner: Does the witness have the question?

The Witness: I would like to have it read.

Trial Examiner: Will you read the question back for the witness?

(Question read.)

A That question, of course, is not complete, because it refers to a previous question.

Trial Examiner: Do you wish the previous question read?

[2547] The Witness: Yes.

Trial Examiner: Read the previous question and answer the question.

(The question is read.)

A And therefore, Yes.

Trial Examiner: Will the witness state what he means by "Yes"? I don't know whether I understood that.

The Witness: You want to know what I meant by "Yes"?

Trial Examiner: Yes. Do you mean "Yes" to the last question as it is worded? I don't know whether I understand fully the meaning as to what a "Yes" shows. Will you again read that last question?

(Last question read again by the reporter.)

Trial Examiner: I think I will have to ask counsel to put that in a little bit different form because a "Yes" is not understandable to me as the question stands.

By Mr. Wahrenbrock: *Q* Has any instance of simultaneous counterflow of electric energy in a conductor ever been demonstrated? *A* Yes, in so far as any flow can be demonstrated.

Q And you have just said that no flow can be demonstrated. *A* I am not certain of the precise words that I used. At the time

I made the statement I was replying to a question that is obviously asked for physical means for ascertaining the nature of the energy flow, direct observational means, on the [2548] conductor itself. Now, no such means are available. Now, in the case of energy flow, we may say that a system of energy flows in the conductors of a system is demonstrated if we show that such a system of flows in no way contradicts any observable fact about the system. Now, if you accept that as meaning a demonstration, then I will say systems of flows or systems of flows and counterflows can be demonstrated. If you mean other than that, then I will have to deny that it can be demonstrated.

[2549] *Q* Has simultaneous counter flow of electric energy in an electric circuit ever been demonstrated by observable facts? *A* Only by this observable fact, that the flows and counter flows assumed will correctly account for the energy generated at the various places where it is observed to be generated, and the energy consumed at the various places where the energy is consumed.

Q But such an assumption is not the only assumption consistent with all facts? *A* No.

Q Then is it accurate to say that simultaneous counter flow of electric energy in a conductor has never been uniquely demonstrated by observable facts? *A* I think I would agree to that, where I assume by the word "uniquely" you mean that other systems can equally well fit the situation in hand.

Q Where there is one generator connected to one load, is the flow of electric energy in the connecting conductor uniquely demonstratable? *A* No.

* * * * * * [2550]

Q Where you have one generator connected to a load A, can the flow of electric energy from that generator to that load be demonstrated? *A* Well, if I understand your question correctly, I believe the answer is no. All that is observed is the generation of energy and the simultaneous consumption approximates the equality of the two magnitudes. Now, if you are asking me to demonstrate something more than that, I cannot do it.

Q There is no way under such circumstances of demonstrating that the electric energy generated is the electric energy consumed? *A* The identity only resides in the equality of the magnitudes. There is no other mark that will give identity to the energy.

Q Is there any difference between—I will withdraw that. I wish you to assume a generator A connected to a load B, by a conductor, and a generator C connected to a load D by a conductor, both generators generating the same amount of electric energy, both loads utilizing the same amount of electric [*2551*] energy. Does the electric energy consumed by load B have any greater—have any other relation to the electric energy generated by the generator A than it does to the electric energy generated by generator C?

* * * * * * [*2553*]

A It is not stated whether the generator A is connected to the generator C by a conductor or not.

Q No connection. *A* Oh, they are not connected?

Q That is right. *A* Then, in that case, the energy generated by A will balance except for losses the energies consumed at B; and the energy generated at C will equal the energy consumed at D. We thus have a special relationship between A and B that doesn't hold between C and B.

Q Making the same statement of facts, generator A is generating 10,000 kilowatt hours during a given period, it is connected properly to a load B, which is consuming during the same period the same amount of electric energy, we will neglect transmission losses, a separate unconnected generator C is supplying the same amount of electric energy through a proper connection to another load D; in both cases the generator is [*2554*] generating 10,000 kilowatt hours, in both cases the load is utilizing 10,000 kilowatt hours. Now, in both cases then, the load is equal to the generation. Do you follow me so far? *A* In each case?

Q In each case the load is equal to the generation. *A* Yes.

Q Then, on my assumption that the generation at A is equal to the generation at B, it happens that each load is equal to the

generation in the other generator. Do you follow me so far? *A* Yes.

Q Now, aside from that equality of amount, is there any relation between the electric energy consumed by one load, by load B, is there any other relation between that electric energy and the electric energy which is generated by generator C? *A* In the case of no connection between A and C, the—

Trial Examiner: Between B and C, I believe it is.

The Witness: The generators are A and C and the loads are B and D?

By Mr. Wahrenbrock: *Q* Yes. *A* And in the absence of connection between A-B and the system C-D we would have equality between B and A regardless of what loads may be on D or generated at C. There is that fact that with the lack of connection load at B always equals [*2555*] the generation at A, makes a special relationship between those two quantities that is characteristic of the lack of connections between the part AB and the part CD. Now it may be that some brief moment in time the generation at A happens to equal the generation at C. That is a purely accidental occurrence. You would have to work very hard to find such moment when those powers just happened to be equal. At such a particular moment, when the power generated at A and the power generated at C happened to be equal, it is true that the energy consumed at B and the energy consumed at D would also be equal, and at such a brief moment you can if you like assign the energy at A to the load D or assign the energy at the load B to the generator C, but that would be a very brief, transient moment when the two happened to coincide in quantity. However, in this case of lack of connection, the energy consumed at B always equals the energy generated at A. Therefore, it certainly is a matter of great convenience in that case of lack of connection to describe that situation by saying that B receives its energy from A, meaning thereby only that under all circumstances the energy consumed at B equals that of A. If there is lack of connection then you know that the energy at B always

equals that generated at A, and to describe that set of affairs you may use the popular language term by [2556] saying that A supplies B, but all you mean is that the energy generated at A equals that consumed at B under all conditions. Now as soon as you put in a connection that equality of consumption at B with the generation at A ceases, and you can no longer use the every day expression that A supplies B because you no longer have that equality.

Q Now, as long as the generator A is connected to the load B, the amount generated at A is at all times equal to the amount generated by the load B. Is that right? *A* In the lack of other connection.

Q In the lack of other connection? *A* Yes.

Q This being the only connection, and the fact of that continuing equality is the only observable fact to result from the connection? *A* From the lack of connection.

Q From the connection between B and A? *A* Well, the mere connection B and A itself is not enough, you must have lack of connection with other parts of the system.

Q The fact of the connection of A and B and the absence of any other connection. I have mentioned no other connection and there isn't any for any of these purposes. I would like to have that assumed to simplify the discussion, please. The existence of a connection between A and B results [2557] in the continual equality of the generation and the load A and B. *A* The existence of an exclusive connection between A and B?

Q Yes, and the existence of an exclusive connection between C and D results in an equality of load and consumption in C and D. Now there is no connection between A and B on the one hand, and C and D on the other, yet if there is at any moment the generation at C equals the amount of the consumption in the load B, would you say that the relationship between the generation C and the load B is the same as the relation between the load B and the generation A, with which the load B is connected? *A* Well, there is equality in magnitude.

Q And that is all that you recognized?

* * * * * *

The Witness: Unless you permit variations in load which would at once reveal that A and B remain equal and C and C remain equal but not A equal to B. Unless you permit such variations, you can distinguish nothing else.

By Mr. Wahrenbrock: [*2558*] *Q* In the absence of variations, the relation of the generation at A, with which the load B is connected is just the same as the relation of the load B with the generator C with which the load B is not connected. Is that true? *A* Yes, it is merely an equality in magnitude. That is all you can determine by this one observation.

Q What do you mean "That is all you can determine by this one observation"? *A* Well, there is no inherent identification in the powers received by the loads B and D. We may for convenience allocate energy from A to B and energy from C to D if it is convenient. Now, if the systems are not connected, then we observe that the energy at A equals the energy at B under all circumstances, and the energy at C equals the energy at D under all circumstances. Therefore, it is convenient to say now we are going to allocate the energy from A to B, and from C to D because we observe they are always equal. However, if there is no opportunity for me to observe that A is always equal to B, and C is always equal to D, but sometimes differ from each other, if you will not permit me to make such an observation, then I will see no convenience served by saying that A feeds C or A feeds B or A feeds D. It is entirely a matter of convenience in making orderly and systematic all of the possible observations that you might make on a system.

[*2559*] If the systems are not tied together, then we will always observe that A is equal to B and C is equal to D under all circumstances, and the saying that A feeds B and C feeds D is simply a convenient way of bearing in mind that A always equals B and that C always equals D and nothing more.

Q And the allocation of a load to a generation is merely a matter of mathematical quantitative equivalents? *A* I am afraid I don't understand the question.

Q As long as a supply of energy is quantitatively equivalent to the amount consumed at another point, the one may be allocated to the other? *A* Yes. Of course, when I say that, I mean that the other loads and the other generations in the system must also be properly allocated to each other.

Q I am not talking about the system. I have two isolated phenomena, consumption of energy at point B and—when I say "consumption", I mean utilization of electric energy at point B and a supply of electric energy at point A. Now, do I understand that in order to allocate the supply to that load, it is only necessary to know they are quantatively equivalent? *A* As far as any physical principles go, that is all you need to know.

* * * * * * [*2560*]

Q So that in the sense in which you have been using allocation, it is not necessary to have an electric circuit between the supply of electric energy and the load? *A* No, it is not necessary. I have, however, tried to bring out that the matters of allocation are entirely those of convenience in describing the relations which exist between the generation and the loads in a system. If a particular load is entirely disconnected from a generator, the generation at that generator may at one moment equal the consumption at that load, but that will in general be so exceptional a case unless the generator is tied to the load by some system, thereby very exceptional that the two will equal in magnitude, so that I don't see how any circumstance would exist where a person would regard it as convenient to say that that load was supplied by that source.

If, however, he found that there was always equality between the generation and the load, as would be the case if there was a single exclusive connection, then I could understand a person, purely as a matter of convenience in describing the relations

which persists, in saying the generator supplies that load, meaning thereby that there is in it nearly an equal but [*2561*] a continuing equality.

Trial Examiner: You would say then that that continuing equality was not accidental in that case?

The Witness: Yes, that it was part of the function of the connection to assure that equality persists.

Trial Examiner: That completes what I wanted.

By Mr. Wahrenbrock: *Q* Now, if A and C are sources of supply of direct current and the amount of energy being supplied is constant, and the amount being supplied at A is equal to the amount being supplied at C, then at any time you would be able to allocate without load at B to the supply at C with which the load B is not electrically connected, as accurately as you could allocate the load B with the supply A?

Trial Examiner: Do you understand the question?

The Witness: May I ask whether the question is at all different from the preceding question except the substitution of direct current for alternating?

Mr. Wahrenbrock: It is just the direct current, and the maintenance of the constant amount being supplied.

Trial Examiner: The fact that the supply at A and the supply at C are the same constant, plus the fact that there is direct current?

The Witness: Then it is the same question, asking me if there is any special relationship.

[*2562*] By Mr. Wahrenbrock: *Q* That is right? *A* Well, I don't see that the relationship is at all altered. The statement that the two are to be kept the same in amount is something that actually cannot be carried out. It is impossible to keep two independently connected loads and sources at exactly the same intensity so that at the best we can only ask for an approximate equality, and the fact is that the loads can be varied in each system, and when they are varied, each load will remain equal in magnitude to the generated supply of that system. The same will hold for

the other system, with the connections that you have described, each generator generates energy equal to that consumed by the load to which it is connected, and that relationship persists, regardless of what is done to the other disconnected system, and it is that state of affairs that tells or impels us, makes it to our convenience, to say that the generator A supplies the load B, merely in that way describing the fact that the energy consumed at B always equals the energy generated at A, regardless of what you may do to the rest of the system.

[*2563*] *Q* If, however, we assume the constancy of the amount of electric energy being supplied and equality as between the two sources of supply, then you would allocate, would you, by your method, the load B to either source of supply. *A* If the generation of the two sources was always the same, and the energy consumed at the two loads was always the same, under those circumstances there would be no reason for you to allocate one load to one source, because there would be no convenience served. Unless you have variations which make it convenient to make a particular kind of allocation, you are free to make any allocation you please.

Q Even though the load B is electrically connected to one supply but not to the other? *A* The only function of the particular connections you have is to insure that when you vary your loads they will be variations independently. How can one determine there is no one connection between the two loads? One may make a visual inspection, but one may fail to observe a hidden conductor that is tying them together. No man can be sure there is no connection between one and the other except observing the generation at A equals the generation at B. If he observes that, then he will be sure there is no interconnection, or at least it would be better said—it would be better if we simply define connection or interconnection in terms of the relationships which these energies have between themselves. If the [*2564*] energy consumed at B always equal the energy consumed at A, under the most various conditions, then you might say that A and B are electrically dis-

connected from all other systems. That would be the mark of its lack of connection, namely, that the energy produced at A equals the consumption at B. That would be a far surer mark than any visual inspection.

Q And that would be true in spite of any visual observation of apparently continuous copper conductors of the usual type between the generator or the source of supply A and the load B, and the absence of any conductor of any recognized type between the source of supply C and the load B? *A* Let us see. The question is not complete in itself. It says "That would be true," and you are referring to my answer?

Q Yes. *A* So I think I will have to have the answer read and then the question.

Trial Examiner: The reporter will read the answer back to the witness.

(Whereupon the last answer as above recorded, was read by the reporter.)

Mr. Wahrenbrock: I will reframe the question.

By Mr. Wahrenbrock: *Q* I believe it will be clearer if I ask you whether, assuming a constant supply of electric energy at A, continuously equal to the supply of electric energy at point B, the [2565] fact that load B is electrically connected to supply A by an obvious copper conductor or set of conductors, whereas the supply C is so far as the most careful inspection will show, carefully insulated from load B, would not prevent you from allocating the load B to either source of supply equally validly, in your opinion? *A* The connection—the description of the connections would be of significance to me only in so far as they affected possible relationships between the energy generation and the energy consumption at the different generating stations and the load. A direct metallic connection observed between A and B, and a lack of direct connection observed between A, B and C and D, would be some presumptive evidence to me that probably the consumption at B is going to stay equal to the generation at A. However, if in spite of that observed connection between A and B, and the

lack of observed connection between A, B and C and D, I saw a lack of equality between generation at B and consumption at A, then I would start hunting for a connection that I had overlooked, or I would look for some other means of transferring energy from one system to the other, perhaps radio or something of that sort. That is, the isolation of system A-B from C-D, to me would be proven by the continued equality of the generation at A, with the consumption at B. I would accept that as a definition of isolation, a preferable defini- [2566] tion of isolation, over any visual inspection.

Q Yes. Now, that answer, as I understand it, goes beyond my question, because my question assumed that there were constant and equal supply of electric energy at A and B, and in your answer you have assumed variations which you would seek to find an explanation for. Now, putting my question again, assuming constant and equal supply of electric energy at A and B, the fact that A is apparently electrically connected to B, whereas C is apparently well insulated from B would not, in your opinion, affect the validity of an allocation of the load B to C? *A* Well, I would say that if the magnitudes of these loads are equal, and one is compelled to assume their continued equality, there would be absolutely no purpose served in making one allocation rather than the other. The visual inspection might prompt one to make one allocation rather than the other, because one ordinarily is not restricted to keeping the loads constant. When one sees that connection, then one thinks, oh, well, this load can change without the other changing. That is, the lack of connection, you can say this load can change without the other changing. You, however, are taking a set of circumstances where one ordinarily rightly draws the conclusion, namely, the set of circumstances being that there is no visible connection, and from which one can ordinarily draw the conclusion that the loads A and B will remain equal in spite of [2567] what may be done to C and D, and where one is accustomed to deriving, to describing that relationship by saying that A supplies B, and C does not supply B, you are taking that set of

circumstances where from observation of lack of connection I would draw these conclusions, and now you are eliminating one of the reasons that I ordinarily have for making that conclusion and hoping that I will not observe that you have eliminated the reason, or your elimination of the reason for not making that conclusion, and say, yes, I would continue to make that conclusion. I would make that conclusion if I were talking to somebody who would allow me to correct myself. What I mean is this: The situation you are presenting is not an accurate situation. The situation you are presenting is where the loads are kept equal in spite of lack of connection. Now, ordinarily the lack of connection itself presumes that the loads will not stay equal. Now, you are asking me if somehow, in spite of the lack of connection, the loads are kept equal, are you going to conclude such and such? How are you going to keep the loads equal without lack of connection?

Trial Examiner: If such an equality existed, Dr. Slepian, and instead of merely a matter of visual observation you had absolute knowledge that there was no connection, would your answer be the same?

Mr. Branch: I am sorry, may I have the question read?

Trial Examiner: The reporter will read the question.

[2568] (Whereupon the last question as above recorded was read by the reporter.)

The Witness: If I had absolute knowledge there was no connection, my answer would be the same, independent of whether the loads were equal or not. That is, if I know there is no connection, then I know that the consumption at B equals the generation at A, regardless.

Trial Examiner: Under those circumstances, would you in any case allot the consumption at B to the generation at C?

The Witness: No, I would find it convenient to allot the consumption at B to the generation at A, because I know that with a lack of connection, with no further information, I know that the

generation at A equals B, and therefore I make that allocation because I know that it would.

Trial Examiner: I think that largely answers my question.

By Mr. Wahrenbrock: *Q* Now, I want to recede a little bit from the point to which we have been carried by the concept of absolute knowledge, and get back to the world where our knowledge is a little less than absolute, and ask whether if the load B and the supply A, to which it is apparently electrically connected, are here in Hartford, and the generator C and the load to which it is apparently electrically connected is in Shanghai, China, and the amount of electric energy being supplied at the point A is continuously equal to the amount being supplied at point B [*2569*] in Shanghai, you would assume or allocate the load B to the generator C, as readily as you would to the supply A?

Mr. Branch: Wait just a minute.

Trial Examiner: I don't know whether I have your B and C and A clear in that, Mr. Wahrenbrock.

Mr. Wahrenbrock: The same as heretofore except we have put supply B over in Shanghai.

Trial Examiner: I had not understood. I suggest that the reporter read the question back.

(Whereupon the last question as above recorded was read by the reporter.)

Trial Examiner: I think you had better put the question again.

By Mr. Wahrenbrock: *Q* I wish you to take the example concerning which we have been considering, and ask you to assume that the supply A and the load B, to which it is electrically connected, are located here in Hartford, and the supply C and the load D to which it is apparently electrically connected are located in Shanghai, China, and ask you whether, if the supply A is continuously equal to the supply C, you would regard the allocation of the load B to the supply C as equally valid with its allocation to the supply A? *A* The preface to this or the preceding question talked about the actual world, and I think i. view of that preface I [*2570*] may first remark that if there is no connection

between the generator and the load in China, and the generator and the load in Hartford, the equality in those loads will not exist; unless there is some means taken to assure they will be equal, they will not stay equal. They will never be equal as a practical matter. Therefore, when you assume equality, continued equality, I must conclude there is some kind of an interconnection between those two systems, and if you will not permit the two loads to be varied independently, then as long as—I would say under those circumstances I would just have to regard that as one system with two generating systems and two loads, and I am not able in any unique way to assign either load to either generator. If I choose to assign the one load to one generator, and the other load to the other generator, it is entirely a matter of convenience. With your premise you have given me no reason of convenience to assign it to one or to the other. With your premise you are saying they remain equal, and because each load remains equal in magnitude to either generator, you deprive me of any reason for assigning that load to one generator or the other. However, I wish to emphasize the situation you have presented cannot accurately be realized without some kind of a connection between the two systems.

* * * * * * [2571]

Q I hope that I have now finished with the A and B and C and D separate circuits, and I wish to return to your earlier illustration of a line with a supply A at one end, a supply B at the other end, with a load C near the supply A and a load D near the supply B. Instead of assuming the amounts of generation and load which you assumed, I wish to change those amounts and to assume a generation of 9,000 kilowatt-hours at A, a load of 5,000 kilowatt-hours at C, a load of 6,000 kilowatt-hours at D, and a supply of 1,000 kilowatt-hours at B. I pause to ask if that is understood on all sides, before I go forward?

* * * * * *

Trial Examiner: As I understand it, Mr. Wahrenbrock, your two generators are A and B?

Mr. Wahrenbrock: Yes.

Trial Examiner: And the two loads are C, 5,000 and D, [2572] 6,000?

Mr. Branch: May the witness see this?

(Diagram handed to the witness.)

Trial Examiner: The two supplies are 9,000 and 1,000 respectively, at A and B?

Mr. Wahrenbrock: Yes.

Mr. Branch: The loads are 5,000 and 6,000?

Mr. Wahrenbrock: Respectively, at C and D.

By Mr. Wahrenbrock: *Q* Now, in this case do you say that it is impossible to assign any part of either load to a specific source of supply?

The Witness: May I ask a question?

Trial Examiner: You may.

The Witness: Is this an isolated system?

Mr. Wahrenbrock: No other connections than those shown.

The Witness: In this picture you have shown me the sum total of the generation is 10,000 kilowatts and the sum total of consumption is 11,000 kilowatts, and therefore it is a case that cannot present itself.

Mr. Wahrenbrock: All right, thank you for pointing it out. Will you change the assumption that B is a supply of 2,000 instead of 1,000?

* * * * * * [2573]

A I say that it is impossible to assign either load to either supply in any particular way in a uniquely demonstrable manner.

By Mr. Wahrenbrock: *Q* Is it possible to conclude that neither Load C or Load D could be exclusively supplied from supply B? *A* I believe that by such a statement you merely mean that the supply B is not adequate for supplying either D alone or C alone, and assuming you mean that, I agree with the statement.

Q Then we must assume that a part, at least, of both loads C and D is supplied from A, must we not? *A* Again if by that

assumption you mean merely that B is not sufficient to complete the supply, B is not large enough in magnitude to account completely for D and C, if that is what you mean, yes.

Q Well, then, in such a case it is possible to allocate at least parts of the loads C and D to a particular source of supply, is it not? *A* Yes, with the meanings that you have just given to the words, yes.

Q Now, I wish to make the further assumption with respect to the case I have just put, that the supply B constitutes the total of the connected supply in Connecticut to the C.P. 1 and C.P. 2 lines, and the loads C and D constitute loads and the [2574] total loads—

Mr. Wahrenbrock: I will withdraw that last—

Q —The load D only constitutes the total connected load in Connecticut on the C.P. 1 and C.P. 2 lines.

Mr. Branch: May we have that question reframed? There was a change there that threw me off.

Mr. Wahrenbrock: I will state it, if I may.

By Mr. Wahrenbrock: *Q* The load B constitutes the total connected loads on the C.P. 1 and C.P. 2 lines in Connecticut. The load D constitutes the total connected to the C.P. 1 and C.P. 2 lines both in Connecticut.

Mr. Branch: Well, I am still not clear as to these things.

Trial Examiner: I am not sure if there is any part of the question which wasn't completed. I would suggest that counsel starts it as a new question, so as to be sure just what is what.

By Mr. Wahrenbrock: *Q* I wish to take the hypothetical situation which we have been discussing previously, and relate it to the C.P. 1 and C.P. 2 lines by assuming that the supply B is the total connected supply.

Mr. Branch: D?

Mr. Wahrenbrock: B as in banana,—is the total connected [2575] supply in Connecticut. The load D is the total connected load in Connecticut. D as in December. I wish to assume further that the load C represents connected loads outside of the

State of Connecticut, total connected loads outside of the State of Connecticut, and A represents total connected supply outside the State of Connecticut. On those assumptions, I ask you whether it must be concluded that part of the load D, representing the total connected loads in Connecticut, is supplied from outside the State? *A* The mere attaching of designations with a geographical flavor to these quantities doesn't change the conclusion. As before, I stated that the assertion that the energy received at D arises partly in A, that that assertion which I was interpreting as being the equivalent of stating that generation at B is insufficient to supply the complete load to D. With that meaning of the statement, I can accede to it. Now, giving a geographical flavor, or, I would say that if, when you say that the energy consumption at D arises partly from generation outside the State, you mean that the generation within the State is not sufficient to supply D, if that is what you mean by it, then I agree to it.

Q I wish to refer to the diagram of the tapped transformer which you prepared yesterday on the witness stand.

Mr. Wahrenbrock: In order to do so, I would like to ask [2576] respondent's counsel if they have that diagram.

Mr. Branch: Yes.

Mr. Wahrenbrock: Would you be willing to do whatever you are going to do in the way of identifying or introducing it?

Mr. Branch: Yes. May I interrupt for just a minute?

Trial Examiner: Yes, for the purpose of identifying the exhibit.

By Mr. Branch: *Q* Dr. Slepian, I show you Exhibit 81 for Identification, which you entitled "Energy Flow in tapped transformer, signed Joseph Slepian", and I also show you another photostat which has been made which is designed to show the same thing, in perhaps a little clearer manner, on account of the difference of paper on which it was written and so forth. Does the paper which is not marked substantially illustrate what you attempted to illustrate in Exhibit No. 81 for Identification? *A* Yes, it seems to.

Mr. Branch: I ask that this sheet, at the top of which is printed

"Energy Flow in tapped transformer", be marked now Exhibit 81-A for Identification.

Trial Examiner: It may be so marked.

(The document referred to was marked as Exhibit No. 81-A for Identification.)

Mr. Branch: I now offer in evidence Exhibit No. 81-A [2577] for Identification.

Trial Examiner: Is there any question?

Mr. Wahrenbrock: It will probably be helpful in understanding the testimony which has been given, and for that reason I have no objection.

Trial Examiner: The diagram marked Exhibit 81-A for Identification will be received in evidence.

(Exhibit 81-A for Identification received in evidence as Exhibit 81-A.)

By Mr. Wahrenbrock: *Q* Directing your attention to Exhibit 81-A, I wish to ask you to explain how the watt-meter by which you say the reading of 9900 watts would be produced, would be connected? *A* It would be connected in the usual way for reading the power, so-called power in a line. The current element of the watt-meter would be placed in series with the line.

Q In series with which line? *A* With the line marked 9900 volts.

Q That is the current— *A* Yes.

Q Transformer. *A* The current element, which may be through a transformer, or may be directly to the line. In case of the 9900 volts it probably would be the transformer. And the potential element which may be through a transformer would be from the [2578] line to the ground.

Q Now, in the case of the watt-meter registering the 10,000 watt reading, how would it be connected? *A* The current element transformer would be placed in series with the 10,000 volt line, and the potential element would be connected between the line and the ground.

Q Why wouldn't you connect a watt-meter in such a circuit by

connecting the potential element across or between the lines marked 10,000 volts and the line marked 9900 volts, with the current element in series with one or the other of those lines? *A* The question I wanted to answer by the use of the watt-meter was the power as defined by watt-meter in the 10,000 volt line. When I connect that meter into that line to determine the power there, I do not know what load it is going to; I do not know the current in the 9900 volt line will have any relationship to the current in the 10,000 volt line. I am asking what is the power, what is the energy flow which seems to have been the discussion of the Commission engineers. Repeatedly, they asked what is the energy flow in that line, and the way to get that energy flow if you use the watt-meter method is to connect the watt-meter in the manner I have indicated.

Q What would a meter, a watt-meter connected as I have suggested, show? *A* I would interpret that as reading the sum of the [2579] energy flows in two lines.

Q In numerical value, what reading would it give? *A* That would be 100 watts.

Q What value does that represent? *A* 100 watts.

Q Does that represent the true-load on the 100 ohm resistance? *A* I do not understand the adjective "true".

Q Does it represent the load of 100 arm resistance? *A* It equals the energy consumption at the resister.

Q Under the conditions shown, what is the current in the lower part of the coil which is grounded? *A* You want it approximately?

Q Yes. *A* Well, I would have to stop and compute it.

Q Well, isn't it readily computable? *A* It will be approximately 1/100 of an ampere, if I haven't made a mistake in arithmetic. Approximately.

Q Wouldn't it be zero except for the charging current? *A* Yes. I revise my answer. It will be nearer to zero than a 100th of an ampere.

Q When you referred in your testimony on direct examination

to the current in the center of a conductor being under some circumstances slightly out of phase with the rest of the current in the conductor, did you have reference to what is [*2580*] generally referred to as the skin effect phenomena? *A* Yes, the same sort of thing.

Q How much would the skin effect phenomena affect the resistance of the conductors in the CP1 and CP2 lines? *A* Do you happen to know the diameter?

Q Assume that the largest cable is 0000 aluminum.

* * * * * *

Q I show the witness Exhibit 38, where the data appears which he asked for, on the CP1 and CP2 lines.

Mr. Branch: That is Exhibit 38?

By Mr. Wahrenbrock: *Q* And I direct his attention to the upper center of Exhibit 38, where those lines are shown horizontally across the page. You have the question in mind, have you? *A* Is the question completed?

Q Yes. *A* Could you tell me what the diameter is in centimeters or inches?

[*2581*] *Q* I can give you the diameter by reference. *A* I don't know what the 0000 cable dimension is.

Q I am sorry, I don't hear you. *A* I don't happen to know what the diameter of the 0000 cable is. I don't carry it in my head.

* * * * * *

Q I show the witness this handbook, and ask him if that is of assistance to him? *A* Yes, that is sufficient information for me to answer. I would estimate that the increase in resistance would be in the order of perhaps a tenth of a per cent. That is an estimate. I could give you a better estimate if I would stop and calculate the details.

* * * * * *

Q I wish now to refer to your statement near the conclusion—

* * * * * * [2582]

Q Did you refer to the reference close to the words, "Switching towers, .12", and what is that reference? [2583] *A* Well, I observed the letters 0000, and that is all that I checked. I took your statement that it was aluminum cable. Perhaps I should not have done so, but I did.

Q Would you understand the initial, "A. C. S. R." to stand for aluminum cable steel reinforced? *A* I wouldn't know it without your having told me.

* * * * * * [2584]

Trial Examiner: Does that change the witness's answer?

The Witness: Yes, if that is not a solid aluminum cable, that would very radically change my answer.

By Mr. Wahrenbrock: *Q* Well, will you state what your answer would be then? *A* I would need to know more about the construction of this cable. I would need to know how long a steel core it had, and how much aluminum, and what the relationship between the aluminum and the core was. Are these aluminum strands winding around the core? I would need to know the construction.

* * * * * *

Q Are you familiar with the convention A.C.S.R? A No, sir.

Q In the description of conductors? *A* No, sir.

Q You are not able to interpret that to me and to verify my interpretation of it, which I offered you? *A* No, sir.

Q You recognized it as a conventional representation of a type of conductor?

Mr. Branch: He already answered, and he said he didn't.

[2585] Trial Examiner: I think he said that he did not.

By Mr. Wahrenbrock: *Q* I am going to refer to the statement you made near the close of your testimony on direct examination, page 2137 of the transcript, wherein concluding an answer you said:

"One hypothesis will satisfy one thing about the origin of

power, and the other will satisfy another thing about the origin of power, and they are equally valid, but we, in our ignorance, do not know which is correct. The simple state of affairs is such that with all the information it is ever going to be possible for us to obtain, nobody is ever going to answer the question in a unique way, as to which load the power from a particular station goes to."

In the light of that statement I wish to ask you whether you are of the opinion that Mr. Miller's method of tracing flows of energy can be shown to be wrong by observable facts?

The Witness: May I ask a question?

Trial Examiner: You may.

The Witness: Will you explain to me what you mean by "showing the thing to be wrong?"

By Mr. Wahrenbrock: *Q* Don't you understand what I mean by that? *A* No, sir.

Q Do you mean to say that Mr. Miller's method of tracing flows can be shown to be invalid by physically observable facts? [2586] *A* Mr. Miller shows certain flows and draws certain conclusions, or rather, I would put it that certain conclusions may be drawn from the flows he shows. Some of these conclusions can be verified by direct observation, in one way or another. Those conclusions will be correct, and I do not think anybody will show that those conclusions are wrong. Other forms of conclusion, other conclusions from his energy flows that one might make, I believe, cannot be verified in any way, and I would say then that if one drew such conclusions from Mr. Miller's representations, and made the correctness of Mr. Miller's representations depend upon the unique validity of these conclusions, that I would say that one would have to say that Mr. Miller's pictures were wrong. That is, Mr. Miller's pictures are correct, if used correctly and to use them correctly, the only correct use you can make of those pictures is to total up the amount of power consumed or generated in various parts of the system. I can take the difference

between what the meter readings at two points in the line are and say that if there is no other connection that the energy consumed in that section of the line between the watt-meters, is given by the difference between those watt-meters, but only such conclusions shall be drawn correctly.

Q I understand that you have indicated by the answer you have just given that some of the conclusions reached by [2587] Mr. Miller in his study are not susceptible of verificarion. Is that right? *A* Of physical verification, yes, sir.

Q Of physical verification, but you don't go further and say that those are susceptible to being disapproved? *A* I go this farther. I say that other equally valid energy flow diagrams can be drawn which will agree with the correct conclusions that can be drawn from Mr. Miller's diagrams, but will disagree with those conclusions which might be naively drawn from Mr. Miller's diagrams, and in that sense I would say that Mr. Miller's conclusions are incorrect, if they are regarded as uniquely valid.

Q You speak of other conclusions equally valid. Do I understand you to mean then that as far as physically observable facts are concerned, his conclusions are valid? *A* Well, the particular conclusions I mentioned, regarding total energy consumed at a load or total energy generated at a point, those are physically observable and those are valid.

Q Are there any conclusions which he has stated in his testimony which you can say from physically observable facts are invalid?

* * * * * * * [2590]

A I would say that the fact that it is possible to construct other energy flow diagrams which agree with observable facts, but disagree with these conclusions of Mr. Miller, which were on the question, I would say that that fact requires one to drop the word "validity" in the usual sense, as applied to Mr. Miller's system.

Q Haven't you heretofore characterized the methods of rout-

ing flows as valid, so long as the total generation equalled the totalled flow? *A* Yes, I have been careful, in all those cases, I believe, to attach other sentences, so that the meaning that I was giving to the word "validity" was quite clear. There are many connotations that one must attach to the word "validity." Where I say that any method of allocating power, all these methods are equally valid, at once I am using the word "valid" in a sense that perhaps you don't use in ordinary everyday life. In everyday life a proposition is either valid or invalid, it is right or wrong. Now, here we are using a device, a method of calculation, if you like, and so on, that will give correct results when used in certain specific ways. It will lead to unverifiable results if used in other ways. Other devices of a generally similar nature will lead to the same correct results, but will lead to different unverifiable [*2591*] conclusions, unverifiable in the sense of direct physical observation. I say that these methods are equally valid, but as soon as I point out that these methods differ among themselves, it is quite clear that when I am using the word "valid" that I am not using it in the sense that I would use it in everyday life where a thing is either right or wrong. In my use of the word I have used sufficient other descriptive matters so that certain connotations which I wanted to retain in my use of the word "validity" were there. If you ask me a simple question and ask me whether the method of Mr. Miller's is valid or is invalid, I can't answer it without some discussion as to what I mean by what "validity" or "invalidity" is.

Q Well, regardless of how far away we may have been led from the assumptions of normal, everyday life, do I understand that the most that you say is that the conclusions reached by Mr. Miller in his study of these flows is that some of them are not verifiable by observable physical facts? *A* No, I say more than that. That is what I am trying to bring out. I do not merely say that some of his conclusions are unverifiable. I also state that other ways of reaching the same verifiable facts will lead to contrary unverifiable facts. Now, I think that that is an important addition.

[2592] *Q* Yes, but you have no basis to indicate any preference among the several ways of routing each of which is unverifiable by reference to observable facts? *A* If I may have preferences under different circumstances, those preferences will be dictated by other considerations than the mere generation and consumption of loads. I may be a load dispatcher and may want to say that I pick up this remote load at this nearby station, but I do that merely as a convenience of deciding how I handle my control boards.

Q There is no physically observable fact with which Mr. Miller's conclusions are inconsistent?

* * * * * *

A Yes, as I have said before, Mr. Miller's conclusions absolutely imply that they are uniquely correct. He says energy coming into this load is Massachusetts energy. He does not say "We may regard it as Massachusetts energy for the purpose of the Federal Power Commission" or something of that sort. He says "It is Massachusetts energy". Now, I say that that is inconsistent with facts, established facts, in [2593] this sense: That I can also draw energy diagrams with just as much right as Mr. Miller, and agree with all the observed facts, just as well as Mr. Miller does, and come to the conclusion that the energy going to this load is not Massachusetts energy. I perhaps won't say it as positively as Mr. Miller says, because I would be aware that there would be other ways of describing it equally validly, but the fact that I am able to do this destroys the implied uniqueness that Mr. Miller puts into his testimony.

Q If you reached such a conclusion there would be no physically observable fact to which reference could be made which would show that your conclusion was a false conclusion? *A* The conclusion that I drew, that I would draw, would be merely that this is an energy diagram that fits the observed facts. That is all I would say about my energy diagram, and that certainly could not be contraverted.

Q And in your opinion is Mr. Miller's routing of flows a routing which does fit all the physically observable facts? *A* No, if we take into account all the implications of the statement. His statement is that a certain percentage, 100 per cent Massachusetts energy, goes into this particular load. That statement is unqualified. Tied up with that statement is implied the unique validity of that statement. It implies that there is no other way of tracing energy flow that would lead to any other conclusion. I am sure that any- [2594] body reading the testimony would say that that is what Mr. Miller teaches. This, I say, is inconsistent. It does not agree with observable facts, because on the facts we can construct other energy flows which would make zero per cent Massachusetts energy go in to the particular load in question, and this other energy diagram agrees just as well with Mr. Miller's diagram, as to all observable facts. Therefore I say that in so far as Mr. Miller's testimony indicated that his method determined uniquely that Massachusetts energy entered into the particular load in question, I would say that that evidence is shown to be wrong by this possibility of constructing other energy diagrams equally valid, which do not show Massachusetts energy entering into that load.

Trial Examiner: I would like to ask a question at this point.

Disregarding entirely the verbal testimony of Mr. Miller, does the diagram or are the elements shown in the diagram uniquely disprovable?

The Witness: Now, there is shown a delivery to C. L. & P. Company, Bristol, a vertical line here. That is marked red. Below there is a caption "Electrical energy from Massachusetts". I see nowhere a statement that this is a possible energy flow. I would say that this chart claims to show actual energy flow as portrayed. Massachusetts energy being identified as Massa- [2595] chusetts energy through various connections, and up to the Bristol line. I say that that statement, implicit in this drawing, is incorrect. because I can construct another diagram with a blue line going from this plant up to Bristol, up to the Bristol line, and other

red lines, which will equally meet the power requirements at loads and generators, and show a different color, show a blue color, going up to the Bristol line. Now, the fact that I am able to construct this alternative diagram refutes what this particular diagram purports to say.

Trial Examiner: Doesn't it still leave this diagram as a possibility of not being uniquely disproved?

The Witness: That is, it does more than that. If I merely said that the particular arrangement cannot be proven, and stopped, then—

Trial Examiner: What I want to know is whether it can be disproved. That is what I am trying to get at.

The Witness: Yes, my claim is that constructing an alternative energy flow diagram equally valid that leads to a different conclusion, is a disproof.

[2596] Trial Examiner: Does that make it uniquely disprovable? Can it be demonstrated by any observable phenomena that this is not true?

The Witness: Well, it seems to me that the fact that I am able to construct a flow diagram that meets all of the observable facts in the situation, and that that flow diagram differs from this, removes the validity of the diagram.

Trial Examiner: Wouldn't the fact that this one could be drawn also remove the validity of the other one?

The Witness: Certainly.

Trial Examiner: Then you could say that neither one can be proved or disproved physically?

The Witness: Yes. What I would like to bring out is no energy flow diagram is valid for other than the purposes which we have already discussed, that are verifiable, namely, totalizing the load. As soon as you try to use any energy flow diagrams for other purposes, to mark power red or label it Massachusetts, or anything of that sort, you are going wrong, because you are stating things to be true that not only cannot be established, but which have no greater validity than contrary statements.

Trial Examiner: In other words, can neither be established or refuted?

The Winess: Yes. Quite the opposite statement is just as valid.

[2597] Trial Examiner: That answers my question. Counsel may proceed.

Mr. Wahrenbrock: I have no further questions, Mr. Examiner.

Mr. Branch: I have just one or two questions.

Redirect Examination by Mr. BRANCH.

Q Dr. Slepian, you referred in answer to recent questions on cross examination, to what a load dispatcher might do by way of attributing a certain load to a certain generator. Will you just explain what you meant by that?

Mr. Wahrenbrock: Mr. Examiner, I think that goes beyond the scope of my cross-examination.

Trial Examiner: I think that has been opened up by the cross-examination, and the question will be permitted.

The Witness: Well, we might take the situation that we have discussed several times, of a line to which a generating station A is connected at one end, and a load B at the same end, and generator C at the far end, and a load D at the far end. Now, A might be a hydro plant, we will say, and C might be a steam plant. D might be a continuous load, and B a variable load. Now, it might be the purpose of the dispatcher to try to keep A station, the hydro station, always loaded, and to use C for picking up the extra load. Now, we might be operat- [2598] ing with A connected and C disconnected. So that A might then be said to be supplying all the load, and all the load might happen to be at D. Now, let us say the load at B picks up. The dispatcher will then start bringing in his turbines at the steam station, and as he puts the—he picks up the load B at the one end of the line on the steam station C at the far end of the line. His picture is that the hydro plant, plant A, is sending energy down the line to the steady load which was always there, and that as the

additional load at B comes on, that he brings in a steam plant C to pick up that load. The station operator's picture, one that will be most convenient for him, would be that the hydro power coming down the line to the steady load, and steam power, or steam electric energy going up the line to take care of the extra load that is picking up there. Now, there is nothing wrong with that picture. It is convenient for him. It balances up the power between loads and stations. The hydro station is still generating just the amount of power consumed by the steady load. The steam station is supplying just the amount of power consumed by the regular load. So, therefore, in convenience, in following through his various operations, he thinks of electric power coming from the hydro station down the line in one direction, and steam power generated at the steam plant going up the line in the other direction, and nobody can say no to him; if he finds it [2599] convenient he is perfectly free to use it as long as he doesn't claim the energy at B is uniquely verifiable in the steam plant. As long as he doesn't make such a statement, he will get into no trouble with his dispatcher. Now, another person under the same circumstances might want to say that some of the hydro power goes to B and the rest goes into D, and that C supplies the rest of D. He wouldn't want to say that B load is part hydro, or say it is all hydro, and that the D load is hydro and steam depending on circumstances? He may do so, but that probably is a less convenient viewpoint if he happens to be the load dispatcher. That is, how you allocate the loads will just depend upon what use you choose to make of that allocation. For one purpose it will be convenient to make one allocation, and for another purpose it will be convenient to make another allocation.

Q And as far as the physically demonstratable facts are concerned, would either of those be fully valid? *A* They both equally well account for the observable facts.

Q In answer to a question on cross-examination yesterday, I think you said that at any given point in any line to which two currents had been applied, the current was the result of the com-

bined action of the two currents. Have I stated your testimony substantially correctly?

* * * * * * [2600]

By Mr. Branch: Well, can you recall—I don't seem to be able to put my finger on it, but can you recall what you did say as to current at a single point in a circuit being the result of combined action of two currents, if two currents were on the line? *A* I am sorry, I don't recall.

* * * * * * [2601]

Q On page 2161, the question was this:

> "Well, where a current then is supplied to a conductor from two sources, if we look at the point where the two conductors come together,"—and that must be "current"—"two currents coming together"—

Mr. Wahrenbrock: No, that was meant to be "conductors".

By Mr. Branch: *Q* Well, all right. "Would it be proper to say that the current in each source is the statistical average of the electrons in that conductor at that point?"

And you answered:

> "At each point in the conductor the current is the statistical average of the motion of the electrons. At each point in the conductor, I said nothing about source. I don't know what you mean by saying 'in each source'."

You were using the term "current" there as something dis- [2602] tinct from electric energy? *A* Yes. It was certainly distinct from electric energy.

Q And generally, where you used the term "current" it is distinct—

Mr. Wahrenbrock: I object to this leading method of questioning a witness on redirect examination. I think it is certainly improper to try to clarify testimony in that way.

Trial Examiner: It seems to me it is very leading.

Mr. Branch: All right.

By Mr. Branch: *Q* I will ask you, in your opinion, are current and electric energy the same? *A* No.

* * * * * * [*2603*]

Q Is the electric energy at any point the statistical average of the motion of the electrons? *A* No, not at all. The electric energy at a point in the conductors, as we have used it, is a purely postulated flow.

Q In one place in your testimony you were asked about various facilities, and among others I think you mentioned transformers as a means of transmission. Will you explain what you meant by transmission of electric energy or transmission, as you have used it in that sense? *A* I believe I was asked as to what my understanding of the meaning of the words "transmission of electric energy" was, and as I remember, my reply was that generation of electric energy at one geographical location, its consumption at another geographical location, and the intervening apparatus, among them being perhaps transformers, wires, and such things that [*2604*] are playing a part in accomplishing this purpose.

Q In using that, did you intend to draw any distinction between facilities for transmission and facilities for local distribution? *A* Oh, no. I didn't mean to go into any such special definition of the word "transmission", and "distribution". I was just speaking in general of the words "transmission of electric energy" as merely the accomplishment of this consumption at a point remote from its production, and nothing more.

Q Do you wish to make distinctions between facilities for local distribution and transmission? *A* No.

* * * * * * [*2607*]

CALVIN T. HUGHES,

a witness called on behalf of the Respondent, previously sworn, testified as follows:

Direct Examination by Mr. SMITH.

Q Mr. Hughes, I believe you stated you are the general superintendent of the Connecticut Light and Power Company, and have been since 1929, is that correct? *A* Since 1939.

Q 1939? *A* Yes.

Q Would you please state your professional training and experience? *A* I was graduated from the University of Oklahoma in 1918; received the degree of Bachelor of Science in Electrical Engineering. During the years prior to 1939, I was responsible for a great many projects throughout the Connecticut Light and Power Company property, such as engineering, construction of electrical equipment, generating stations, transmission lines, [*2608*] substations, and distribution systems. At the present time, I am generally responsible for the operating, construction and maintenance matters throughout the Connecticut Light and Power Company system. This includes the generation, transmission, and distribution of electric energy. I am a registered engineer in the State of Connecticut, and a member of the American Institute of Electrical Engineers.

Q Are you familiar in a general way with the facilities of your company, such as generating plants, transmission lines, and substations? *A* I am.

Q Are you also familiar in a general way with the electric system of the Borough of Groton, in Groton, Connecticut? *A* I am.

Q Does your company sell electricity to the Borough of Groton in Connecticut at the present time? *A* Yes.

Q Have you prepared figures showing the total energy generated and received by your company for the years 1937 through 1940? *A* Yes.

Q Will you kindly give those figures, starting with the year 1937?

Mr. Wahrenbrock: Mr. Examiner, I object. I don't see any relevancy.

[2609] Trial Examiner: I think the question may be relevant. The witness may answer the question.

Mr. Wahrenbrock: Well, Mr. Examiner, may I say if this is to show the proportion. the ratio of electric energy which is on some assumption sold in interstate commerce to the total amount of this company's, I submit that it has no relevancy whatsoever to any issue in this proceeding.

Trial Examiner: I don't think there has been any declaration as to the purpose of it.

Mr. Wahrenbrock: Aside from that, I see no relevancy whatsoever of the total figures, and on that assumed possible relevancy, I would like to be heard.

Trial Examiner: You may be heard.

Mr. Wahrenbrock: I think it is incumbent upon respondent's counsel to state what his purpose is in proving this before I answer, and to show the irrelevancy.

Trial Examiner: Well, it seems to me that the whole subject is relevant to the proceedings here. I see no reason for going into any specific offer of proof as to something which is generally relevant. The witness may answer.

A The company generated and received in the year 1937, 748,186,164 kilowatt-hours.

In the year 1938, 670,029,034 kilowatt-hours.

In the year 1939, 780,109,105 kilowatt-hours.

In the year 1940, 871,985,957 kilowatt-hours.

[2610] By Mr. Smith: *Q* Will you give us, Mr. Hughes, the ratio which the electric energy sold by the Borough of Groton to Fishers Island for the years 1937 to 1940 bore to the total of the electric energy generated and received by your company in these same years?

* * * * * * [2612]

A In 1936 it was 19/100ths of one per cent.

Trial Examiner: I don't think that is responsive to the question. I believe the question was 1937 to 1940, was it not?

The Witness: Pardon me.

A (Continuing) In 1937 it was 19/100ths of one per cent. [*2613*] In 1938 it was 21/100ths of one per cent. In 1939 it was 18/100ths of one per cent. In 1940 it was 17/100ths of one per cent.

[*2614*] By Mr. Smith: *Q* Have you the ratio for the year 1936, Mr. Hughes? *A* Yes.

Q What is that? *A* It was .19 of one per cent.

Q And for the year 1941, the total of the year, if you know, did the Borough of Groton sell to Fishers Island Farms or Fishers Island Electric Company? *A* 1941?

Q Yes. *A* No, they didn't sell. They sold for a short while.

Q Directing your attention, if you will now, Mr. Hughes, to Bristol, are you familiar with the facilities of your company located at Bristol, Connecticut, and what your company does there in connection with the purchase and distribution of power? *A* I am.

Q Does the company purchase power from the Connecticut Power Company at Bristol? *A* It does.

Q Have you had prepared figures showing the total amount purchased by your company from the Connecticut Power Company at Bristol for the years 1937 through 1940? *A* I have.

Q And you have also just given, have you not, the figures showing the total energy generated and received by your [*2615*] company for its entire system for the same years? *A* Yes.

Q And have you figured out the percentage of the amount purchased at Bristol to the total generated and received for these years? *A* Yes.

Q Will you kindly give these figures, starting with the year 1937?

Mr. Wahrenbrock: Mr. Examiner, I make the same objection that I previously made to the ratios.

Trial Examiner: The objection is overruled. It may be material to certain questions in issue.

The Witness: For the year 1937, the company purchased from

the Connecticut Power Company at Bristol 60,107,000 kilowatt hours.

Q Now, what was the ratio of this total amount purchased and generated by the company, which figures you have already given? *A* It was 8.03 per cent. For the year 1938, the company purchased 59,804,000 kilowatt hours, which was 5.94 per cent to the total generated and received.

Q Would you look again at the figure for the amount purchased at Bristol? *A* Pardon me. I was mistaken. It is 39. 39,804,000.

Q And that was what per cent of the total generated [*2616*] and received? *A* 5.94.

Q Now, for the year 1939. *A* The company purchased 55,280,000 kilowatt hours, which was 7.09 per cent of the total generated and received. For the year 1940, the company purchased 65,474,000 kilowatt hours, which was 7.51 per cent of the total generated and purchased.

Q Do the figures of the amount purchased relate only to Bristol? *A* Yes.

Q I show the witness a single line diagram marked Bristol and hand one to the Examiner, one to the Commission's counsel, and one to the reporter, and I ask the witness what this is? *A* It is a single line diagram of the Bristol Electric supply facilities.

Q When was this diagram prepared? *A* It was prepared June 3, 1941, and the latest revision is as of July 24, 1941.

Q Was this prepared under your direction or control? *A* The original preparation was not under my direction or control, but the revisions were made and corrected under my direction.

Q Have you examined this diagram, and can you state whether it correctly depicts the facilities of the Connecticut [*2617*] Light and Power Company as shown thereon, at Bristol, at the present time? *A* It does.

Mr. Smith: I ask that the single line diagram be marked as Exhibit 82 for Identification.

Trial Examiner: It will be so marked.

(The document referred to was marked as Exhibit No. 82 for Identification.)

Mr. Smith: I offer Exhibit 82 for Identification in evidence.

* * * * * * [2618]

Q Mr. Hughes, will you by reference to Exhibit 82 for Identification, if you will, describe in a general way the facilities of the Connecticut Light and Power Company at Bristol, Connecticut? *A* The facilities of the Connecticut Power Company are terminated at the outdoor steel switching structure owned by The Connecticut Light and Power Company—

Trial Examiner: I will ask the witness to speak just a little louder.

The Witness: —with the exception of certain facilities in the substation used to operate oil breakers on Bristol Mountain, Tower 474. The power purchased comes from the 66,000 volt lines of the Connecticut Power Company, which run from the South Meadow substation in Hartford to Falls Village. At Tower 474 these lines are tapped by a line about a mile and a half in length, consisting of steel towers, which run from the 66,000 volt lines to the company's station in Bristol.

Q Who owns this tap line and the switching facilities that you have referred to? *A* The Connecticut Power Company.

Q Where does the ownership of any facilities of The Connecticut Light and Power Company start? *A* The company owns the facilities located in its substation at Bristol, which is surrounded by a wire fence, starting [2619] with an outdoor steel structure, to which the lines of the Connecticut Power Company run.

Q You stated an outdoor steel structure. Are the facilities of the company at Bristol located outdoors, in the open? *A* The facilities are located outdoors and indoors.

Q Will you describe what your company does with the power which is received at Bristol? *A* We purchase the entire electric service requirements for the Bristol district from The Connecticut

Power Company. This service is taken at 66,000 volts, metered, switched, and transformed to 13,800 and 4800 volts.

* * * * * *

Q Mr. Hughes, the bus which is labeled "4.8 k. v."—there are two buses, I guess—near the lower right-hand corner of the [*2620*] diagram, and the circuit connecting it with the transformer is designated "4,800 v.". Is that the same as the 4.6 k. v. that you refer to in your testimony? *A* It is. We use that term rather loosely, 4.6 classification or 4.8, and this actually is 4.8. It is a general terminology without too much distinction made between the two. It is a class of service.

Q Does this diagram purport to show the circuits by which remote control switches, oil circuit-breakers, are operated? *A* It does not.

Q Then the omission of any circuits, or controls for oil circuit-breakers at or near tower 474 is not to be understood as meaning that there are no such circuits or that there are no such controls in the Bristol substation? *A* That is correct. The controls are there, the property of the Connecticut Power Company.

Mr. Wahrenbrock: I have no objection to the admission of Exhibit 82.

Trial Examiner: The drawing will be admitted in evidence as Exhibit Number 82.

(Exhibit Number 82 for Identification was marked as Exhibit 82 in Evidence.)

By Mr. Smith: *Q* Mr. Hughes, directing your attention to Exhibit 82, will you state what the circuits on the bottom of the map, start- [*2621*] ing with the Number 1609 on the left-hand and running to 1605 on the right-hand are? *A* I don't believe I got that question.

Trial Examiner: Read the question back to the witness.

(The question is read by the reporter.)

A They are numbers of circuit-breakers.

By Mr. Smith: *Q* What are those lines numbered "46" on the

left to Number "5" on the right. *A* Number 41, 42, 43, 44, 45 and 46 are 13,800 volt circuits.

Q And where do they run to? *A* Some of them run to the New Departure Company in Bristol, to the Ingraham Company, New Departure Forge Company, Bristol Brass Company, Wallace-Barnes Company, and a few more industrial power customers.

Q What are the lines numbered 1 to 5 on the right-hand side of the bottom of the diagram? *A* They are 4,800 volt circuits.

Q And where do they run? *A* They radiate out in several directions from the substation, supply primarily the domestic or residential customers, and commercial customers, with a few small industrials. The last is the circuit that is associated with breaker 1613 which is connected to a 1,500 k. v. a. transformer bank which steps [*2622*] the voltage down to 2,300 volts, or 2.3 k. v. It serves as street-lighting circuits and a very small amount of load in the business center of Bristol, commercial load, primarily.

Trial Examiner: That is the one which is shown on the drawing just above the 4.8 k. v. bus lines there and directly above the stamp in the lower right-hand corner?

The Witness: That is correct.

By Mr. Smith: *Q* Will you state when the facilities of The Connecticut Light and Power Company described on Exhibit 82 and located in Bristol substation, were installed? *A* About 1926, the general design for the existing substation was made. This design provided for ultimately three transformer banks, of which one was installed at about that time. It also provided for the establishment of the 13,800 volt bus and a 4,800 volt bus. These were installed in the period of 1927 and '28. The synchronous condenser was installed late in 1928 or early '29. The second transformer bank was completed and cut in operation in 1929, which completes the installation approximately as it is today, which consists of six 13,800 volt feeders and six 4,800 volt feeders, included in the latter six, of course, is the feeder which supplies the 1,500 k.v.a. transformer bank and [*2623*] the 2.3 k.v. bus which I previously mentioned, the 66,000 volt bus struc-

ture and switching equipment, together with metering for measuring the energy at 66,000 volts and certain protective equipment.

[*2624*] Mr. Wahrenbrock: Mr. Examiner, I am going to move that that answer be stricken, inasmuch as it goes back of the period of time when the witness is shown to have been with the company, as I recall it.

Mr. Smith: You say it is prior to the time he was with the company?

Mr. Wahrenbrock: Yes. Am I mistaken as to the recollection of the date?

Mr. Smith: I believe you are.

By Mr. Smith: *Q* When did you first come with the Connecticut Light and Power Company?

A December 19, 1918.

Q Who designed these facilities in this substation which you have described? *A* I did.

Q At the time of the installation and design of these facilities at Bristol substation, what, if any, other facilities were installed or designed? *A* There were other facilities installed in connection with design and construction of the substation. All circuits, that is, the 13,800 volt, the 4800 volt circuits, which originated in the substation, were revamped, reconstructed, and the voltage changed, and additional circuits added. Or, in other words, a complete system was worked out for supplying the [*2625*] territory.

Q You have stated that you supervised the design and construction of these facilities of the Connecticut Light and Power Company. Did you at that time have any objective or plan which you wished to accomplish? *A* Yes.

Q Will you state what this objective or plan was? *A* The company had purchased the Bristol property about 1926. Due to increased loads in the district, it became evident very shortly that the existing facilities were inadequate to provide proper service, and I was assigned the task of designing a complete distribution system to replace the inadequate ones, this to include all neces-

sary facilities from the point of receiving the power to the ultimate delivery to customers. This study early indicated that it would be economical to utilize two voltages. Hence, the transformers were purchased with three windings, namely, 66,000 volts, 13,800 volts and 4800 volts. The 13,800 volts would be used to supply the larger industrial loads, and the 4800 volts to supply the residential and some commercial loads. The smaller amount of load in the center of the city was retained at the prior voltage of 2300 volts. The plans had not progressed very far before it was realized that the heavy industrial loads had a low power factor, [2626] that is, required a considerable excitation current. So it was decided to install a 10,000 k.v.a. synchronous condenser and connect it to the 13,800 volt bus which supplied the larger part of the industrial load. The location of the present outdoor bus structure, transformers, and appurtenances, was determined by the following factors: First, it was necessary to maintain service throughout the construction period over the then existing facilities. Second, at that time there was a steam heating plant which occupied the space immediately south of the present brick building which houses the indoor substation. Therefore, the present location was adopted.

Q Is there anything in the design or structure of the facilities which you have described which were adopted, or which were uniquely adopted to receive energy from out of the State? *A* No.

Q Bearing in mind, if you will your objective or plan, will you state the functions performed by the various facilities of the company in Bristol, those facilities which you of course have described? *A* All the facilities are used for the purpose of distributing locally the power received from the Connecticut Power Company to the customers of the Connecticut Light and Power Company.

* * * * * * [2627]

Trial Examiner: Do I understand there is an objection?

Mr. Wahrenbrock: The answer came so quickly, I didn't get a chance to make an objection.

Trial Examiner: I thought counsel started to rise.

Mr. Wahrenbrock: * * * And I therefore am going to object to the question and move that the answer be stricken until that is done.

* * * * * * [2630]

Q Mr. Hughes, in your opinion as an engineer, bearing in mind, if you will, the explanations you have made of the functions performed by these facilities, in your opinion are these facilities used in the local distribution of electric energy?

Trial Examiner: You may answer the question.

The Witness: Yes.

By Mr. Smith: *Q* Is that true or is—I withdraw that.

Is your opinion which you have expressed applicable to all of the facilities of the Connecticut Light and Power Company shown on Exhibit 82?

A May I have the question again?

Trial Examiner: The reporter will read the question for the benefit of the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: Yes.

By Mr. Smith: [2631] *Q* Is it not true that all of the facilities of the Connecticut Light and Power Company shown on Exhibit 82 to effect voltage changes do so for the purpose of more efficient or convenient transmission of the energy so purchased?

Mr. Wahrenbrock: I would like to have the question repeated so that I can understand it.

Trial Examiner: The question will be read back.

(Whereupon the last question as above recorded, was read by the reporter.)

Trial Examiner: Suppose you state the question again.

By Mr. Smith: *Q* Is it not true that all of the facilities of the company located at this substation to effect voltage changes, do so for the purpose of the more efficient or convenient transmission of the energy so purchased?

Mr. Wahrenbrock: The question is leading in form, but I don't know that it does any harm.

Trial Examiner: If there is no objection, the witness may answer the question.

The Witness: No. Changes are all effected as a part of the function of distribution. It would be more efficient not to change the voltage from 66,000 volts, and it would be more convenient not to change the voltage if we are going to continue to transmit it. But the changes of voltage make the distribution more convenient. None of the facilities of the [2632] company at Bristol are used for the transmission of energy purchased from the Connecticut Power Company, since all of the energy purchased is immediately distributed locally.

* * * * * * [2634]

Q Mr. Hughes, can you state what the distribution center at Bristol is?

* * * * * * [2635]

The Witness: One was "receiving point" and another term, "the center of distribution". By "center of distribution" in speaking of a territory or an area or a district that is being supplied with electric service, we ordinarily mean some point at which the customers on an average were about equidistant from that point. In other words, it might be termed a center of gravity. No, it isn't a center of gravity, it is the center of the area, when you consider the load and the customers. By "receiving point" it is my understanding of that term as to where the energy is received if you purchase energy. Shall I continue?

Trial Examiner: I think that clarifies that point. Now, does the Commission counsel desire to be heard further?

Mr. Wahrenbrock: Yes, certainly, with respect to the term

"distribution center" I think that it has not been shown [*2636*] that it has any peculiar meaning on which this witness is competent to testify as to its meaning. He hasn't been drawn out by the framing of the question, as to what the particular meaning was in which it is used in the question, and further than that its materiality or relevance to any issue in this proceeding is certainly not apparent.

Trial Examiner: It doesn't seem to me that as the witness understands the center of distribution that it would be material to any issue in this hearing. Does counsel for the respondent desire to be heard further on that point?

Mr. Smith: May I ask the witness one or two questions to clarify that?

Trial Examiner: You may.

By Mr. Smith: *Q* Where would you say, Mr. Hughes, the receiving point of energy purchased by your Company from The Connecticut Power Company is?

Mr. Wahrenbrock: Mr. Examiner, I object to that question, on the ground that the best evidence of that is the contracts, which are in evidence, if as the witness has said, by "receiving point" he means the point of delivery.

Trial Examiner: I think those are shown by the contract.

By Mr. Smith: *Q* Do you know what the contract states as to point of delivery at Bristol? [*2637*] *A* Yes, I believe so. "Shall be delivered to the Bristol substation."

Q And where is the distribution center at Bristol in relation to the receiving point?

Mr. Wahrenbrock: Well, I object to that. It is the same question I previously objected to.

Trial Examiner: It doesn't seem to be material. It may have some slight relevance. With the explanation that we have had, we will permit the witness to answer the question.

The Witness: May I have that question again, please?

Trial Examiner: The reporter will read the question for the benefit of the witness.

(Question read.).

A The distribution center is very near the location of the substation which is the receiving point.

By Mr. Smith: *Q* Now, are you able to answer the question: Are the facilities of The Connecticut Light and Power Company at Bristol between the receiving point and the entrance to the distribution center, as you have defined these terms?

Trial Examiner: I don't see how you are going to place something by the entrance to a geographical point, because, as he has defined the term, that is all the distribution center is, a geographical point determined by comparison.

Mr. Smith: Very well.

[*2638*] By Mr. Smith: *Q* Mr. Hughes, can you state whether the primary purpose of any of the facilities of the Company at Bristol, as shown on Exhibit 82, is to augment, integrate or tie together the sources of power supply?

Mr. Wahrenbrock: Mr. Examiner, I don't see the relevancy of that. That has nothing to do with the case. I object to that as being immaterial and irrelevant.

Trial Examiner: I see no reason why the witness may not answer. The objection is overruled.

A No, there is only one source of power supply in the area, and that is at the receiving point, the lines of The Connecticut Power Company.

* * * * * * [*2640*]

Q Directing your attention, Mr. Hughes, to the Robertsville Winsted line as it was for the years 1927 to 1933, I ask you [*2641*] whether, at either Robertsville or Winsted there was a load center? *A* There was a load center at Winsted. There was no load center at Robertsville.

Q What was there at Robertsville? *A* There was a small hydro-electric plant.

Q And was there anything else at Winsted, directing your attention to substations? *A* There was the Winsted substation.

Q And what was the purpose of that substation? *A* To supply service to Winsted.

Q I now direct your attention to the Torrington-Winsted line for the same period of time and ask you what was at Torrington?

Mr. Wahrenbrock: Mr. Examiner, I think that is an awfully general date.

Trial Examiner: As of what date?

Mr. Smith: 1927 to 1933.

Mr. Wahrenbrock: There was probably a general store, or maybe a county seat there. That has nothing to do with the issues in this case.

Mr. Smith: I am trying very hard not to lead the witness.

By Mr. Smith: *Q* What was there in relation to electrical equipment, if you will, of the Connecticut Light and Power Company?

[*2642*] Trial Examiner: I think counsel can go that far without any danger?

A There was a substation at Torrington and a line from Torrington to Winsted.

By Mr. Smith: *Q* Was there any other type of station? *A* There was a steam generating plant at Torrington.

Q I now show you, Mr. Hughes, Exhibit 68, which purports to be a map filed by your Company as part of its power system statement for the year 1937, and direct your attention to the substations on the left of the map, listed under the classification "Transmission substations", with particular reference to the Bristol substation, and to the substations listed under "Distribution substations", with particular reference to the Winsted-East Hampton and Collins Hill substations, and ask you if you know why these substations were classified as transmission or distribution?

Mr. Wahrenbrock: Mr. Examiner, I must object to that. No basis has been laid to show that Mr. Hughes has any basis of knowledge in knowing why this map was prepared as it was prepared, or that he has anything to do with the preparation of the report or the map.

Trial Examiner: I think that might well be clarified by Mr. Smith.

Q Mr. Hughes, I believe that this report was submitted [*2643*] some time in 1938. Were you with the Company during 1937 and 1938? *A* I was.

Q And when this report was submitted, did you have any knowledge of it at the time? *A* Yes.

Q Did your duties of the Company at that time have anything to do with substations? *A* Yes.

Q Of your own knowledge, or did you have at that time knowledge of the preparation of this report? *A* I had knowledge of the preparation of the map and the information that is shown on the map.

[*2644*] *Q* Will you explain what your knowledge is? *A* The instruction on the map, that came with the form for the preparation of the map, was not specific. Therefore, in order to show the lines, the substations, an arbitrary rule was adopted which has been in practice for some time.

* * * * * * [*2645*]

Q Prior to the preparation of this map, Mr. Hughes, to your knowledge, did the company ever classify its substations for purposes other than this map? *A* There was a classification so-called, made in 1929.

Q What was that classification?

Mr. Wahrenbrock: Mr. Examiner, I am going to object to that question unless it is shown the purposes for which the classification was made.

Trial Examiner: Well, that will have to be made a part of the examination. I think possibly one question may be asked at a time.

By Mr. Smith: *Q* In your answer, will you state what the purpose of that classification was? *A* The company for a number of years prior to 1929 did not have any working classification of its substations. As a matter of fact, for purposes of operation,

all substations were and still are treated as conversion substations, without any attempt being made to differentiate as between transmission and distribution.

* * * * * * [2647]

Q I am asking you why the company classified its accounts as you have stated in 1929, and what the purpose was for so classifying them? *A* For accounting purposes. It is an arbitrary rule which was adopted, whereby all substations of 66,000 volts—

Mr. Wahrenbrock: I am going to ask if I may interrupt, because I think it appears from the statement that the classification was made for accounting purposes, and it has no relevancy to the matter under consideration.

Mr. Smith: I think that the witness is entitled to state why in 1929, the classification was adopted, and if later on this can be used as an explanation of any later classification, I think that has considerable bearing on why or why not certain classifications were used by the company.

Trial Examiner: It may be relevant. I don't know how material it is. We will permit it.

By Mr. Smith: *Q* Will you start again your answer to my question as to why and how in 1929 you classified your substations? *A* For accounting purposes, an arbitrary voltage rule was adopted, on October 21, 1929, whereby all substations of less than 33,000 volts were listed as distribution, and all substations of 33,000 volts or more were listed as transmission.

Q Now, do you have any knowledge of your own, or did [2648] you in 1937 or 1938, of why the classification on Exhibit 68 was adopted? I am now asking you, Mr. Hughes, whether you have any knowledge, and did have?

Mr. Wahrenbrock: Mr. Examiner, may it appear on the record what the documents are to which the witness has been referring, whether they are prepared by him or not, and what it is that he is leafing through?

Trial Examiner: I think the witness may state to what he has referred.

The Witness: Exhibit 68 has on it a tabulation of transmission substations.

By Mr. Smith: *Q* Let me interrupt you first, Mr. Hughes, to ask you whether you have any knowledge of your own, or did have, in 1937, or 1938, as to why the substations of the company were classified as they were on Exhibit 68? *A* Well, it was an arbitrary rule whereby all substations of 66,000 volts—

Mr. Wahrenbrock: I am going to object to a continuation of this testimony until the basis of his knowledge is laid.

Trial Examiner: I think the witness misunderstands the question. The question is as to the basis of your knowledge. It is attempted first to develop your knowledge before the main question is put. It is necessary first to establish the basis of your knowledge, so if you will confine your answer [*2649*] to that for the present—

The Witness: I am familiar with the lists of the substations that are shown on Exhibit 68, and I am generally familiar with the map and the facilities, and with how they are prepared.

By Mr. Smith: *Q* And were you in 1937 and 1938 familiar with how your company was classifying its substations? *A* Yes.

Q And how was it classifying its substations in 1937 and 1938?

Mr. Wahrenbrock: Mr. Examiner, I am going to object unless it is stated for what purpose it was classifying its substations.

Trial Examiner: That is what I understood by the question how, that he meant for what purpose. Is that the understanding?

Mr. Smith: That is correct.

Trial Examiner: With that understanding the witness may answer the question.

The Witness: The substations were classified as transmission or distribution stations.

Mr. Wahrenbrock: Now, I am going to object to a continuation of the testimony unless it is restricted and limited according to the Examiner's ruling.

[2650] Trial Examiner: The question is not what the classification was, but what the purpose of the classification was, the question how, meaning the purpose and not the manner of the classification.

By Mr. Smith: *Q* Were there, Mr. Hughes, or was there in 1937 and 1938, any purpose or purposes for which the company classified its substations? *A* Yes, there were purposes.

Q What were those purposes? *A* They were classified for accounting purposes.

Q For any other purposes? *A* They were classified for the purpose of the preparation of this map.

* * * * * * [2651]

Q Mr. Hughes, you testified that the company's substations were classified for the purposes of this map. Did you have anything to do with that classification? *A* It was a company rule that I understood.

Q And was that a rule under which you operated? *A* Yes.

* * * * * * [2653]

Q Mr. Hughes, I would now like to direct your attention to the facilities of the Company at Torrington. I believe when you were on the stand a day or so ago you described how The Connecticut Light and Power Company obtained power at the present time, and has obtained power since June 17th of this year, from the Torrington Electric Light Company. Will you describe that again, please?

Mr. Wahrenbrock: Without asking that the question be read, what period of time is involved?

Mr. Smith: June 17th to date.

A The power we received from the Torrington Electric Light Company is generated at a steam generating plant located in Torrington, in which there are four steam turbo-generators.

By Mr. Smith: *Q* Have you inspected this plant yourself? *A* Yes.

Q What is the capacity of this generating plant of the Torrington Electric Light Company? *A* 5,500 k.v.a.

Q Can you tell me the power load of your Winsted district? *A* Approximately 2,000 k.v.a.

Q Will you describe briefly the Robertsville plant of your Company at Winsted? [2654] *A* At the north end of the Winsted district is a small hydro-electric plant. This plant contains two water-wheel generators, and when water is available in the river, it is able to carry about 600 kilowatts.

Mr. Smith: I show the witness a diagram entitled "Single-line diagram, Winsted Electric Supply" and hand one to the Examiner.

Trial Examiner: Has Commission counsel seen this?

Mr. Smith: And one to Commission counsel, and ask the witness what this diagram is.

A Single-line diagram of the Winsted electric supply.

Q As of what date are the facilities on this diagram depicted? *A* July 24th, 1941.

Q And are the facilities as shown on this diagram those that have existed since June 17th of this year? *A* Yes.

Mr. Smith: Mr. Examiner, the other day when Mr. Hughes was on the stand previously, we submitted a substantially similar diagram which was marked for identification. I would now like to have this diagram marked for identification as the same number as the other diagram and withdraw the other diagram.

Trial Examiner: Well, why not mark it as an A number. It is not necessary that the other diagram be offered. It may be related to it as an A number.

[2655] Mr. Smith: I ask that this diagram be marked as Exhibit 80-A for Identification.

Trial Examiner: It will be so marked.

(Document referred to was marked Exhibit Number 80-A for Identification.)

By Mr. Smith: *Q* Have you examined Exhibit 80-A for Identification Mr. Hughes? *A* Yes.

Q And are you able to state whether or not the facilities as

shown thereon are correct as of the date from June 17th, 1941 to date? *A* Yes.

Mr. Smith: I offer Exhibit 80-A for Identification, in evidence.

* * * * * *

Mr. Wahrenbrock: On this Exhibit, I am not sure that there is anything that needs to stand in the way of its admission, if two or three small matters can be cleared up. I would like [*2656*] to ask the witness one or two questions. First a very minor matter.

By Mr. Wahrenbrock: (On voir dire) *Q* Directing your attention to the so-called 2.4 k. v. distribution bus, I would like to ask first where you get that name "Distribution" from? *A* It was just arbitrary, just an arbitrary pick-up. It has no significance particularly, as defined by that. That is the main bus in the station. That is what is intended to be there, the main bus. It is a bus from which power is distributed, and a great many feeders go off of that bus to the Torrington Company's territory.

Q Do I understand that is a designation you have applied to the bus? *A* Yes. I think it has no particular significance in my mind.

Trial Examiner: By that I understand you to mean that that is the designation by which it is known to the employees?

By Mr. Wahrenbrock: *Q* By which employees? *A* Myself and the people in our company that just have occasion to refer to this drawing.

Q You don't want to be understood as saying that the officials or employees of the Torrington Electic Light Company have designated the bus by that name? [*2657*] *A* I don't know what they designate it as.

Q Have you ever heard them call it a distribution bus? *A* I have only called it a main 2,300 volt bus or main 2,400 bus.

Q At the right-hand end of that bus the circuit that drops down to the middle heavy bus has an oil circuit-breaker and three disconnects, two of the disconnects are labeled A and one of them is

labeled B. Will you explain whether all of those circuits are located outdoors or are some of them in the station building? *A* The disconnects that are labeled "A" right underneath the word "bus"—is that where you refer to?

Q Yes. *A* They are either side of the oil circuit-breaker. They are in the yard, and following down below those, the disconnect marked "B" is inside the station, in back of the switchboard. It is the disconnect that I believe had some tubing over the blade or some fiber, something of that sort.

Q Did you finish your answer? *A* This diagram doesn't purport to show all the details of instruments, and that sort of thing. It shows the main connections for the flow of power.

Q I would like to direct your attention particularly to the disconnect marked "A" immediately below that oil switch, that oil circuit-breaker, just below the word "bus" and ask you [*2658*] to consider carefully whether there is such a disconnect. *A* May I look at my notes?

Q Yes, sir. I would like to get it cleared up accurately. *A* My notes show Yes, there is a disconnect there, and it is located out in the yard.

Q I wish to ask you whether the so-called 2.4 k. v. distribution bus is the only bus of that voltage in the Torrington Electric Light Company's substation? *A* There is a transfer bus that can be energized from the main distribution bus as shown here, and which serves as a spare connection when circuit-breakers are taken out of service.

Most of the circuits, including the one to the left, that is connected to this 2.4 k. v. has an air break switch which is similar to most of the other circuits that connect this so-called auxiliary or spare bus. There are other buses in the yards that are primarily for connection purposes, and are associated with the physical layout. Due to the fact that they are handling very heavy currents, they have had to resort to some mechanical designs there. It doesn't affect the electrical circuit as such, and which are not in-

cluded in the present electrical circuit, and therefore omitted from this drawing just for clarification.

[2659] *Q* Do I understand that this circuit leading down to the 2.4 k.v. bus from the side of the top part of the substation, marked "From Connecticut Power Company", represents a single connection to the bus, or is there more than one connection? *A* There is more than one connection to that bus. As a matter of fact, I recall five.

Q Is there any arrangement of circuits and buses by which energy from the Connecticut Power Company could, by the closing of the disconnects and circuit-breakers reach the circuit which leads to the right from the point marked "Dead end", without going through any of the disconnects and circuit-breakers shown on this diagram? *A* Yes. I referred to that. If I understand what you mean, there is an air break switch that bypasses that breaker that you referred to, which is on the left end of the 2.4 k.v. distribution bus, and that air break disconnecting switch connects to the transfer bus that I referred to a moment ago.

Q Then this diagram represents only part of the facilities by which circuits could be arranged in The Torrington Electric Light Company substation? *A* With the exception of that air break switch.

Q An auxiliary bus and substation bus and— *A* Well, the air break switch is the only connection that makes with this.

[2660] *Q* And as you said before, you haven't represented all the circuits coming from the Connecticut Power Company? *A* No, we haven't.

Q Is there now any physical difference—I will withdraw that and put it this way:

Have any of the physical facilities which were in existence prior to June 17th been disconnected or removed? *A* No, they haven't.

Mr. Wahrenbrock: Mr. Examiner, my position on this exhibit then is this: That the witness's testimony shows that it is partial. I make no point, no particular point of that as long as the record shows it is partial and what it omits.

Trial Examiner: I think in view of the fact it does show certain facilities and the record shows what facilities are not shown on it, that the exhibit is admissible.

Mr. Wahrenbrock: I would like to make one further statement.

Trial Examiner: Very well, you may do so.

Mr. Wahrenbrock: I do have a specific objection to the use of the word "distribution", which has no foundation in usage or the nomenclature of the owner of the facilities. I think that should be stricken from the diagram.

Mr. Smith: We have no objection, Mr. Examiner, to have that stricken.

Trial Examiner: All right, with the understanding that [*2661*] the reporter will strike, before marking the exhibit, the word "distribution",—and I think counsel for both sides should point out to the reporter so that she will know what it refers to—with that understanding, we will proceed to make that correction.

Has the correction been made, Miss Reporter?

The Reporter: Yes, it has.

Trial Examiner: With the correction made, the diagram is received in evidence as Exhibit 80-A.

(Exhibit 80-A for Identification received in evidence as Exhibit 80-A.)

By Mr. Smith: *Q* Mr. Hughes, referring to Exhibit 80-A, if you will, will you continue your description of how the Connecticut Light and Power Company obtains energy from the Torrington steam plant? *A* The energy when generated by the steam turbine is connected by means of the 2.4 k.v. bus through cable and an oil circuit-breaker through metering equipment, by way of conductors which span the Naugatuck River, through transformer bank located on the property of the Torrington Electric Light Company, but which is the property of the Connecticut Light and Power Company.

Q Now, with the exception of the transformer bank, who owns all the other facilities you have just described? [*2662*] *A* The transformer bank—the Connecticut Light and Power Company

own all the facilities in the small substation west of Naugatuck River, where are located the three 1,000 k.v.a. transformers, or the 3,000 k.v.a. bank.

Q And directing your attention to the diagram, the left portion where the word "West" appears, is that approximately where the Naugatuck River is—I mean, everything west of the word "west" there on the diagram? *A* No. The Naugatuck River appears between where the word "Dead end" is and the line that runs obliquely up the page and connects with what is labeled a 2.4 k.v. Near that line.

Q And then what happens to the energy when it gets up to the 2.4 k.v. transformer? *A* It is stepped up to 27,600 volts, and there are two lines that go from Torrington to Winsted, which lines are terminated on a 27.6 k.v. bus at Winsted, from which bus two 1500 k.v.a. transformers supply service to Winsted.

Q Does the company supply any customers directly from either of those two lines running to Winsted from Torrington? *A* Yes.

Q Who? *A* I will spell this name because it is—The Oneglia & Gervasini Gravel Company.

* * * * * * [*2663*]

Q I understand that you state formerly other customers were served? [*2664*] *A* Yes.

Q Can you state during what period of time these other customers were served, and how many? *A* There were—prior to, or about the time, about 1930 and prior to that time, there were other customers supplied from the line.

* * * * * * [*2665*]

Q Mr. Hughes, I will pass to another subject, and ask you if you have made a calculation of the amount of energy which your company has purchased from the Torrington Electric Light Company for the years 1937 through 1940?

Mr. Wahrenbrock: Mr. Examiner, it seems to me we have already gotten a lot of information about that. As I recall, we went

down the whole line over my objection, and got how many [*2666*] dollars it amounted to each month. Are we going to repeat that for the third time?

Trial Examiner: I am inclined to believe that the information has already been given as to certain purchases from the Connecticut Power Company. Now, is that the same purchases you are talking about?

Mr. Smith: I believe that Mr. Miller offered testimony of purchases by the Torrington Electric Light Company from The Connecticut Power Company. These are purchases by The Connecticut Light and Power Company from the Torrington Electric Light Company. This is the second step. Commission counsel has only offered testimony on the amount of purchases of the first step, that from The Connecticut Power Company to Torrington. I now want to offer evidence of the amount purchased from Torrington to Winsted.

Mr. Wahrenbrock: We had some figures that got down into dollars, as to what the value of the energy sold from The Connecticut Light and Power Company to The Torrington Electric Light Company was.

Mr. Smith: That is quite right.

Mr. Wahrenbrock: And that was based on the amounts for those same sales.

Mr. Smith: That is quite correct.

Mr. Wahrenbrock: Are we going to repeat that again?

Mr. Smith: It was sales from The Connecticut Light and [*2667*] Power Company to the Torrington Company. I want to get sales from the Torrington Company to The Connecticut Light and Power Company. There has been no evidence of this.

Trial Examiner: Counsel may proceed with the witness.

By Mr. Smith: *Q* Have you made such a calculation, Mr. Hughes? *A* Yes.

Q Will you state the amount that your company purchased from The Torrington Electric Light Company for the year 1937? *A* 3,347,600 kilowatt-hours.

Q What percentage is that of the total energy generated and received by The Connecticut Light and Power Company, which figures you have previously given?

Mr. Wahrenbrock: I object to that again, Mr. Examiner. The ratios are irrelevant and immaterial.

Trial Examiner: It may be immaterial, but it may be relevant to some matters at issue. The witness may proceed. *A* Decimal point 47 per cent.

By Mr. Smith: *Q* Is that 47/100ths of one per cent? *A* That is right.

Q Will you tell me for the year 1938 what you purchased from The Torrington Electric Light Company and what percentage this figure is? *A* 3,769,600 kilowatt-hours or 56/100ths of one per cent.

[*2668*] *Q* For the year 1939, will you give me the figures? *A* 6,033,600 kilowatt-hours, or 77/100ths of one per cent.

Q For the year 1940. *A* 6,782,200 kilowatt-hours, or 78/100ths of one per cent.

Mr. Smith: You may examine.

Cross Examination by Mr. WAHRENBROCK.

Q Is The Torrington Electric Light Company using all of its steam generators to supply the Winsted requirements now? *A* No.

Q What is it using? *A* It is using the generator indicated, 3,125 k.v.a. unit.

Q Has it been using that unit consistently since June 17th? *A* No.

Q What units has it been using? *A* I think for a short time on June 29th or thereabouts that unit was shut down for a short while and they used the 1,250 k.v.a. unit.

Q Do you know why they shut down the bigger unit? *A* I understood a bearing got warm.

Q Was that the only occasion on which the bigger unit was shut down? *A* So far as I know, yes.

[2669] *Q* Do you know whether that bigger unit was shut down from 8:45 in the morning until 10:15 in the evening on Sunday the 20th of July? *A* I didn't know that.

Q Have you heard of the necessity of replacing carbon brushes on that unit? *A* No.

Q Do you know whether on the 19th of June the Winsted switch was open for a while because of no steam? *A* May I get the memorandum?

The Trial Examiner: The witness desires to get a memorandum on the table, from which he may refresh his memory.

By Mr. Wahrenbrock: *Q* Was the memorandum prepared by you? *A* Yes.

* * * * * * [2675]

WILLIAM A. LEWIS, JR.,

a witness called on behalf of the Respondent, being first duly sworn, testified as follows:

Direct Examination by Mr. BRANCH.

Q Will you please give your name? *A* William A. Lewis, Jr.

Q What is your home address, and your business address? *A* Home address, 415 Cayuga Heights Road, Ithaca, New York; New York business address, Cornell University, Ithaca, New York.

Q What is your position? *A* Director of the School of Electrical Engineering, Cornell University.

Q How long have you held that position? *A* Since February, 1939.

Q Will you please state your technical education and experience? *A* I graduated from the California Institute of Technology [2676] in 1926 with the degree of Bachelor of Science. I continued graduate work at that Institute receiving the degree of Master of Science in 1927, and Doctor of Philosophy in 1929.

Q Excuse me. May I suggest that you go more slowly. *A* I had previously been connected with the Westinghouse Electric & Manufacturing Company in Los Angeles, from February, 1920,

and at various times during my college years. The work during that interval consisted first of drafting, and later engineering on switchboard and switch gear equipment. In June, 1929, I went to the Westinghouse Electric & Manufacturing Company in East Pittsburgh, Pennsylvania, as a central station engineer, and I continued in that capacity until February, 1939, when I joined the staff at Cornell University. At East Pittsburgh my duties consisted of investigations and studies in connection with transmission of electric power, and the protection of electric systems. These studies involved long distance transmission, power supply to electrified railways, power systems, stability and methods of protection against trouble. In September, 1936, my duties were expanded to include consulting service to the central station customers of the Westinghouse Company in the New England district, and I made periodic trips to New England at intervals of approximately six weeks. These trips were for the purpose of assisting [*2677*] engineers of the power companies in determining their needs for equipment manufactured by the Westinghouse Company, and assisting in its proper application. The Westinghouse Company manufactures and sells steam turbines, electric generators, synchronous condensers, transformers, switch gear protective equipment, and many other items essential to the development of the power system.

Q Of what technical society are you a member? *A* I am a member of the American Institute of Electrical Engineers.

Q On what committees of that Institute have you served? *A* I have been a member of the Committee on Protective Devices since, I believe, 1933; of the Committee on Power Transmission and Distribution, since 1939; and of the Committee on Basic Sciences since 1940. I have just been appointed Chairman of the Committee on Basic Sciences for the year 1941-42.

Q Are you the author of any books or publications? *A* Yes.

Q Will you mention some of them? *A* I published a book on "Symmetrical Components as Applied to Advanced Alternating Currents." There have also been published ten articles

or papers written by me alone or in conjunction with someone else. Among these were articles on equivalent circuits of power and regulating transformers, [2678] and regulating transformers in power system analyses.

Q To what extent are you familiar with the facilities of the Connecticut Power Company at its South Meadow substation? *A* I have seen diagrams of these facilities as they have existed there, which, I believe, are Exhibits 38 and 60, and I have also visited the substation.

Q I show you Exhibits 38 and 60 and ask you if those are the diagrams to which you refer? *A* Yes, they are.

Q You have also visited the substations? *A* That is correct.

Q Are you familiar with the so-called Connecticut Power lines 1 and 2 and the Hartford-Agawam lines, so-called, and the E-line, so-called, which goes to the State line in New York? *A* I have seen the diagram showing these, which I believe is Exhibit 60 and I have seen some parts, but not all of these lines.

Q Have you read the description of the facilities of the Connecticut Power Company, the Connecticut Light and Power Company, and the Hartford Electric Light Company in Mr. Thomas's testimony in this case? *A* Yes, I have.

Q And have you studied the diagram, which is 38, Exhibit [2679] Number 38? *A* Yes,

Q And have you also studied the diagram which is Exhibit No. 82, showing the Bristol substation? *A* Yes, I have.

Q And are you familiar with the fact that the so-called Hartford-Agawam line extends to Massachusetts and is therefore connected with lines which are at times connected with generating plants in Massachusetts? *A* Yes.

Q Are you familiar with the connections between the Hartford-Agawam lines and the substation at South Meadow? *A* Yes.

Q Are you familiar with the action of a wattmeter? *A* Yes.

Q What does it indicate? *A* A single-phase wattmeter has a single potential coil and a single current coil. Such a meter indicates the average value of the instantaneous product of the

voltage connected to the voltage coil, and the current connected to the current coil. It may be shown that this is also equivalent to the product of the effective value of the voltage, the effective value of the current and the cosine of the phase angle between them which is usually designated as the power factor.

[2680] *Q* You have mentioned a single-phase wattmeter. What if any other types are there? *A* There are polyphase wattmeters. On polyphase systems it is common practice to use a polyphase wattmeter which consists of two or more single-phase wattmeter elements, mechanically connected, so that the total indication is the sum of the corresponding values for each of the single-phase elements.

Q How are polyphase wattmeters usually connected? *A* They are usually connected to a three-phase circuit, to indicate the total of the product, previously described, for the entire three-phase circuit.

Q What is a watt-hour meter? *A* A watt-hour meter is a meter which integrates the indications shown by a wattmeter over a period of time, the result being indicated in watt-hours or kilowatt hours or multiples of these units, as convenience may dictate.

Q Is a watt-hour meter a device to measure the flow of energy? *A* In a certain sense, yes. I have previously described that the meter integrates the product of the voltage connected to the voltage coil, the current connected to the current coil and the power factor. Over a period of time and under certain basic assumptions this indication may be considered to represent the flow of electric energy from a point on one side of the meter to a point on the other side of the meter.

[2681] *Q* Have you read the description of the various ratchet meters in the substation of the Connecticut Power Company at South Meadow and the adjoining plant of the Hartford Electric Light Company, in Mr. Miller's testimony in this case? *A* Yes, I have.

Q And what kind of meters are those ratchet meters which he

describes? *A* The ratchet meters are polyphase watt-hour meters, so arranged that they will indicate the flow of the product I described in a single direction only.

Q Are you familiar with the log sheets used by The Connecticut Valley Power Exchange? *A* Yes, to the extent that I have examined the photostats of some of them, so as to be familiar with the way in which they are kept.

Q Have you examined the log sheet of The Connecticut Valley Power Exchange for January 15th, 1939? *A* Yes, that is one of the sheets I have examined.

Q Would any study based on the information which could be obtained from that log sheet of January 15th, 1939, showing the first nine hours of the morning, based also on the readings of any other wattmeters or watt-hour meters—

* * * * * * [*2682*]

Q Would any study based on the information which could be obtained from that log sheet of January 15th, relating to the first nine hours of the morning, based also on the readings of any other watt-meters or watt-hour meters, together with knowledge of the method of operations shown thereon during that time, together with knowledge of location of the meters and the readings made from them, conclusively show that the load of The Connecticut Light and Power Company at Bristol was served exclusively during those hours with energy generated outside of Connecticut, as for example, in Massachusetts, in your opinion?

* * * * * * [*2683*]

A No.

[*2684*] By Mr. Branch: *Q* Will you explain? *A* Where several loads are connected with two or more sources of generation, so far as I know, there is no established principle by which energy in any particular load may be identified as to its source, and I therefore do not believe it possible to definitely conclude from any watt-hour meter readings showing the resultant flow of energy, where the source of that particular load may have been.

Q Why, in your opinion, would not the readings from the watt-hour meters and the other things indicated on the log sheet be sufficient basis to be conclusive? *A* The watt-hour meters show only the resultant or net energy flow, and in my opinion it is possible for the energy to be resolved into components from different sources flowing simultaneously in opposite directions. For example, in this case, it appears that the resultant energy flow in the South Meadow station during the hours in question is from the Connecticut Power Company transformers to the Hartford 11 k.v. bus; but it also appears that during all these hours there was a substantial amount of power generated in the South Meadow station of the Hartford Electric Light Company; considerably more, in fact, in each of the hours in question than the load at Bristol. In my opinion, it is possible for the power generated in [*2685*] Hartford to flow through the transformers in question to the Connecticut Power lines 1 and 2, and to supply the load at Bristol, in spite of a greater flow in the opposite direction through the same transformers.

* * * * * *

Q On what do you base this conclusion? *A* In many cases in electrical engineering, it is convenient to consider the total current flow in a conductor as being composed of several components which, added together, give the total current. In all such cases, to my knowledge, this hypothesis properly applied leads to correct results. Consequently, many engineers definitely believe that the components of current have definite existence in the conductor at the same time. This hypothesis is not affected in any way by the fact that these components of current may be flowing in the same direction or in opposite directions at the same time. There is no physically demonstratable fact which will prove [*2686*] that these components do not physically exist. Under this hypothesis that the components of current may flow in opposite directions, there will be associated with each component of current a corresponding flow of energy which may therefore be flowing also in opposite directions at the same time.

Q Can you indicate common examples where this method of solution is regularly used in engineering practice? *A* There are several. One of the most common is the auto transformer. I will illustrate this by means of a sketch.

Q Have you the sketch here? *A* Yes. (Handing document to counsel.) Which compares the auto-transformer with the corresponding two-winding transformer.

Q You have just handed me a sketch, at the bottom of which are the words, "Auto-Transformer, alternative presentation".

Mr. Branch: I ask that this be marked Exhibit 83 for Identification.

Trial Examiner: It will be so marked.

(The document referred to was marked as Exhibit No. 83 for Identification.)

* * * * * * [2687]

Q Does that represent an auto-transformer? *A* It represents, the top of the sketch, a two-winding transformer, and in the two lower figures an auto-transformer.

Q Does it correctly represent the general features of those transformers? *A* In accordance with the usual diagrammatic representation of such apparatus.

Mr. Branch: I offer it in evidence.

Mr. Wahrenbrock: No objection.

Trial Examiner: It will be received in evidence.

(Exhibit 83 for Identification received in evidence as Exhibit 83.)

By Mr. Branch: *Q* Will you continue with your explanation, please? *A* In the two-winding transformer, as shown here in the sketch at the top of the sheet, the current in the primary winding and the current in the secondary winding are entirely separate and distinct because there is no electrical connection between the two windings.

In the auto-transformer, the two windings are combined, [2688] but the magnitudes of the current entering and leaving

the terminals may be substantially the same as in the corresponding two-winding transformer. It is then possible to consider that the primary and secondary currents flow simultaneously in opposite directions in the common part of the winding, as illustrated in the second part of my sketch in the center of the page. Actually, however, the resultant current which would be measured by an ammeter in the winding is the difference between the two currents flowing in opposite directions. Either method of representing the current in the common part of the winding leads to correct results, and it is very common to consider that these currents flow simultaneously in opposite directions in the same conductor, and there is no proof that this is not so.

* * * * * *

Q Will you mention other illustrations? *A* Another illustration commonly encountered occurs when currents of different frequency flow simultaneously in the same conductor. This is most commonly encountered in [*2689*] communication circuits, such as the telephone and telegraph, where a single wire or single circuit may be transmitting messages in both directions at the same time. At the terminals, by means of suitable filters, the resultant current in the wire is readily separated into components, and several messages completely distinguish from each other. In power circuits exactly the same phenomenon exists when the current wave form is not the desired sine wave. In such a case, the resultant current may be considered at any point, and it will have a definite direction at any instant of time. On the other hand, the usual method of engineering treatment is to resolve such a current wave into a sine wave of what is called fundamental frequency, and other sine waves of higher frequency, which are usually called harmonics. It is a well-known theorem that the fundamental and the harmonic waves may be treated in the conductor as if they were entirely independent and had no effect upon each other. It is quite common for the

fundamental and the harmonic waves to flow in opposite directions, and this method of analysis gives results in agreement with experience and test.

Q Can you give another example or illustration? *A* Another illustration of common usage is the method of symmetrical components used in the analysis of unbalanced conditions on a three-phase power system, such as is being [*2690*] considered here. In accordance with this method, whenever the currents in the three phases are unbalanced, they may be resolved into three sets of components, known as the positive sequence, the negative sequence, and the zero sequence components. The positive sequence set of components consist of three balanced currents having the normal phase sequence. The negative sequence set of components consists of three balanced currents, but in this case having the opposite phase sequence. The zero sequence set of components consists of three equal currents in phase with each other. In accordance with this analysis, the current in any phase consists of the appropriate positive sequence current components, the negative sequence current component, and the zero sequence current component, all added together to give the resultant current that would be measured in the conductor by means of an ammeter. An engineer who frequently uses this method comes to think of these components as having actual existence, and as flowing simultaneously in the conductor at the same instant. The unbalance which gives rise to these components occurs most frequently as the result of a short circuit on the system, and for such a condition it is quite common for the positive sequence component to flow in one direction in the conductor, and the negative sequence or zero sequence component to flow in the opposite direction at the same time.

[*2691*] In the same manner, if we assume that power is represented by the product of effective voltage, effective current, and power factor, the corresponding energy associated with this flow of current may also simultaneously flow in opposite directions, and the engineer who deals with this problem conceives of these

components of energy as being just as distinct as the energy associated with the three separate phases.

[*2692*] *Q* Can the sequence components of current be measured? *A* Yes.

Q How? *A* By suitable instruments which, for current measurements would consist of the usual ammeter provided with what might be called a sequence filter or segregating network which selects the proper component and discards the ones not desired.

Q You have referred to current being resolved into components. Can the same thing be done for voltages? *A* Yes, from the analytical standpoint, in exactly the same manner.

Q Can the component voltage also be measured? *A* Yes, by means of a voltmeter and a suitable network or filter designed for voltage measurement.

Q Can the corresponding energy components of the sequence currents and voltages be measured? *A* Yes, if we assume that energy flow is shown by watt-hour meter indications. Using conventional watt-hour meters provided with suitable segregating networks for both voltage and current.

Q Will the sum of the energy components, as determined by these meters, be equal to the total energy as measured by the common polyphase watthour meter? *A* Yes. In the normal or balanced three-phase system, the sum will be the same, provided the direction of flow of each [*2693*] component is properly considered. That is, the components which flow in one direction are added and the components which flow in the other direction are subtracted.

Q Are you familiar with the theorem of superposition? *A* Yes.

Q What is it? *A* It is a method widely used in the analysis of electric circuits, in which the complete solution is obtained by first obtaining several partial solutions and then obtaining the complete solution by adding together the results of the several partial solutions. In each of the partial solutions a component of current is determined in each branch of the system and the

complete current in each branch is composed of the appropriate sum of the currents found in each of the partial solutions.

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Q In your mind, do these components obtained in the partial solutions have actual existence? *A* They may have, although their identity is not unique. The results obtained by considering that these components have physical existence simultaneously are the same as the results [2694] obtained by any other method of solution.

Q You have already stated that you believe it to be possible for two or more currents to flow simultaneously in a given conductor and for some of these components to have the opposite direction to the remainder. If this were true, would it not follow that the energy loss in the conductor computed in accordance with this theory would be much greater than that which is actually observed? *A* Certainly not.

Q Please explain. *A* Any hypothesis, to be valuable, must be in accordance with the experimental facts. To complete this hypothesis it is necessary to consider that the loss is not due to any single component of current, but is due to the resultant current. On that basis the calculation of loss is in agreement with the calculation of loss in the conductor by any other method.

Q You have described for us several illustrations where it is common practice for the engineer to assume that the total current of a conductor is composed of two or more components, which may flow in opposite directions simultaneously. May such methods be applied to the power systems we are considering, that is, The Connecticut Power Company's system, the Hartford Electric Light Company's system in the vicinity of the South Meadow substation of the Connecticut Power Company? [2695] *A* Yes.

Q How would you apply this method? *A* When two or more sources of generation are connected to a system, it is frequently convenient in calculating the current distribution to consider each

source separately and to add the results to obtain the complete solution when both sources are in operation. By this process the current in each conductor would consist of at least two components which might be flowing in the same or opposite directions. As applied to the system you have mentioned, this would mean that the current in the Connecticut Power transformers at South Meadow Station might be considered to consist of two or more components of current flowing simultaneously.

Q Is the resolution of a given current into two or more components unique? *A* No. Several such resolutions are possible.

Q In accordance with the process you have described, when two or more sources of generation are connected to a system, is it possible to trace by meter reading the source of the energy consumed by any of the loads? *A* No.

Q Please explain. *A* Since it is possible to resolve the current into components in different ways, and these components may correspond to different possible distributions of energy, it is not possible [*2696*] to definitely state that any one distribution by any one hypothesis is any more reliable or correct than some other distribution computed in accordance with a different hypothesis.

Q Is there in practice any other process of tracing energy flow that is commonly considered, but which is not based on watthour meter readings? *A* Yes.

Q What is it? *A* A process which I might call the increment of loads theory. In accordance with this theory an increment of load is applied to the system having more than one class of generation and it is considered that this increment of load is supplied by the source of generation at which the input is increased in order to carry the increased load.

Q Does this theory depend upon meter reading? *A* No. By suitable control, an increase in load at any point of the system may be applied to any source of generation on the system capable of carrying the increase in load.

Q For what purpose is this theory used? *A* It is frequently used in dispatching the load.

Q In accordance with this method of procedure, if two or more increases in load at different points are simultaneously applied to the system and two or more generators supply greater load, can the increments be individually traced to the source of generation? [*2697*] *A* No, not uniquely.

Q Why not? *A* It is a mere matter of choice for the dispatcher or other person having control to determine which increment of load is assigned to each source of generation, and several possible choices will exist.

Q Now, in accordance with any method or hypothesis of energy flow, is it possible to determine from the readings of any type of meter connected to the facilities of The Connecticut Light and Power Company at Bristol the source of that energy which is consumed at Bristol?

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A No.

By Mr. Branch: *Q* Why not? *A* Energy is intangible and has no characteristic that will identify its source. If a wattmeter reading is treated as a measure of the energy present at that point, it nevertheless gives no indication as to its source.

Q You said a wattmeter. Would the same be true of the [*2698*] reading of a watt-hour meter? *A* Yes.

Q By resolving the current into components at this point in the system, is it possible to trace the source of energy which flows to the load of The Connecticut Light and Power Company at Bristol, for example? *A* No.

Q Please explain. *A* Since the resolution of the current into components can be accomplished in more than one way, the resolution is not unique, and tracing the flow of energy by one analysis is no more certain to be unique than by any other analysis.

Q I have asked you recently certain questions relating to the

load at Bristol. Would your answers be equally applicable if the questions were asked of the load of The Connecticut Light and Power Company at East Hampton and at Winsted? *A.* Yes. The answer is based on general considerations which would apply at any point.

Q At any time in which a load, or the loads of The Connecticut Light and Power Company on the C.P. lines aggregate a smaller number of kilowatt-hours than the total amount of kilowatt-hours generated at plants in Connecticut, electrically connected with those loads, is it possible to demonstrate that any of the load of the Connecticut Light and Power Company is supplied in whole or in part by energy generated outside of [*2699*] Connecticut? *A* In my opinion, no.

Q In your opinion is there any scientific basis for concluding that if two generating plants are connected with an electric system, the loads also connected with this system receive electrical energy from the two sources in the same proportion as the proportions of generation? *A* No.

Q Will you explain? *A* I have already testified that there is no means available to trace the energy delivered to any particular load under the assumption that there are more than one load and more than one source of generation sufficiently large to supply any particular load. It is therefore not possible for me to conclude that any particular load will therefore definitely be supplied in any fixed proportion from any source or group of sources.

Q Do you feel that experience in the mixing of the flow of liquids or gases in a pipe from two sources, and the intermingling of the substances which result will furnish any assistance in determining what happens to energy from two sources connected to a long electrical conductor? *A* No.

Q Why not? *A* I do not believe that the analogy applies. The flow [*2700*] of gas or the flow of water is a flow of material or discreet particles within a restricted conductor or pipe. The flow of energy is intangible and we have no definite means of

knowing that the energy actually flows at any time inside the electrical conductor. A concept which I accept provides that the energy in an electric circuit is assigned to space outside the conductor in the surrounding region, and the energy itself is in no way restricted to the physical dimensions of the conductor. In such a case it seems to me that any analogy based upon physical motion within a restricted pipe or other conductor has no significance. Furthermore, since energy is actually intangible, there is still no basis, under any hypothesis, regarding the location of the energy for drawing any analogy between the two types of flow.

Q I now come to another matter. What is the function of a two-winding transformer? *A* The function of a two-winding transformer is to change the voltage of an electric circuit to a different value, more suitable for the immediate purpose.

Q Will you describe briefly the main parts of a transformer? *A* A transformer consists of a magnetic circuit, by means of which two or more electric circuits are magnetically inter- [*2701*] connected, without any electrical connection. The simplest transformer consists of an iron core and two coils of wire wound around this core. In general the number of turns in one coil differs from the number of turns on the other coil, and the ratio of the number of turns corresponds closely to the ratio of the voltage on one side of the transformer to the voltage on the other side of the transformer. One of these coils is usually called the primary winding and the other side the secondary winding. This designation is arbitrary, but for a transformer intended to transmit power in only one direction, the coil or side of the transformer receiving the energy from the line is usually called the primary and the side of the transformer which transmits the energy beyond is usually called the secondary. Depending on the function of the transformer, either the primary or the secondary may be the high-voltage side or coil of the winding.

Q Please describe briefly the operation of a transformer. *A* Current flow will occur in the primary winding of the transformer when a voltage from an external circuit is impressed upon the

terminals of the primary coil of the transformer. This current flow carries with it a flow of energy into the transformer winding and in the transformer the energy is converted largely to electro-magnetic form which is considered to be stored in the iron core of the transformer and the space surrounding it.

[*2702*] If the secondary winding of the transformer is connected to an external load, the magnetic changes taking place in the core will induce by electro-magnetic action a voltage in the secondary coil which in turn causes a current to flow through the secondary coil and into the external load. In this action, a large part of the magnetic energy carried into the transformer from the primary winding is conducted away from the core by the secondary winding, and the energy is thereby transferred through the transformer to the load connected to the secondary.

Q In accordance with your understanding of the action of the transformer, what has happened to the energy in flowing through the transformer? *A* In accordance with my conception, the energy undergoes essentially a double transformation. As it enters the transformer from the external circuit, it is partly in electro-magnetic and partly in electrostatic form. The design of the transformer is such that the energy is converted almost entirely to electro-magnetic form in the core of the transformer, and in the secondary it is again converted, so that part of the energy flowing out is again in the electrostatic form.

[*2703*] *Q* What is the difference between energy in electrostatic form and energy in magnetic form? *A* Energy in electric form appears whenever a difference of potential or difference of voltage is maintained between two conductors. In accordance with the widely accepted basic concept, an electric field appears between any two conductors between which a difference of potential or voltage exists, and this is accompanied by a storage of energy. The basic concept universally held is that the energy is actually stored in the space between the conductors, with each volume of space absorbing a certain fraction of the total energy. The mechanism by which the energy

reaches the space, or the mechanism of storage itself, are unknown. Energy in magnetic form is associated with the flow of current in a conductor. The basic concept is that every conductor carrying current has associated with it a magnetic field, both inside the conductor and outside the conductor, in which energy is stored. Again the concept universally held is that the energy is actually distributed throughout the space, and that each unit volume of space around the conductor absorbs a certain fraction of the associated energy which is stored. Again, the mechanism of energy transmission and energy storage are not definitely known.

Q What characteristic of the transformers serves to transform the energy into magnetic form? [*2704*] *A* It is the property of the iron core of the transformer. The ability of any circuit to store magnetic energy is measured by a circuit characteristic called the inductance. When the inductance of the circuit is large, the circuit has the ability to store large amounts of energy in magnetic form. There are two properties of the transformer which increase the inductance of the winding, and therefore calls for a large amount of magnetic energy to be associated with the transformer winding. One of these properties is the grouping together in close proximity of many turns of the winding. There is a mutual action between these turns which increases the inductance. The other property is the characteristic of the iron or steel core known as permeability, which measures the ability of the iron or steel of the core to make the magnetic field very much more intense, and thereby to greatly increase the inductance and the ability of the winding to absorb magnetic energy.

Q In general terms, what is the significance of this change in energy largely to the magnetic form in the region of the transformer core? *A* We may say that the energy has thus been rendered into what might be called a very adaptable form because it can be reconverted from this form by means of a suitable secondary coil into the form most adaptable for the purpose to be served. For example, if it is desired to transmit the energy a long [*2705*] distance, the secondary winding can be designed to increase the

voltage to a very high value, and the corresponding current will be reduced to a relatively low value. It is then possible to use a relatively small conductor and transmit the energy to a remote point with relatively low losses. On the other hand, if the energy is to be used to drive a machine, light a lamp, or carry on a chemical process, the voltage may be reduced by a proper secondary winding to the value most suitable for the load. Broadly speaking, I would say that the energy inside the transformer has been converted and reshaped so as to give it new characteristics.

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Q How does an auto-transformer differ from what you have called a two-winding transformer? *A* In an auto-transformer, one of the windings which we may for convenience call the secondary winding, instead of [*2706*] being used independently is so connected that the voltage of the secondary winding adds or, in some cases, subtracts from the voltage impressed upon the primary side.

Q In accordance with your explanation of the transformation of energy within a transformer, a two-winding transformer, will you explain what happens to the energy in an auto-transformer? *A* In an auto-transformer, part of the energy received is transformed or converted in form, just as in the usual two-winding transformer. Another part of the energy received at the transformer is passed through without transformation, and the result is, therefore, that the energy leaving the auto-transformer has been only partially transformed instead of completely transformed as in the two-winding transformer.

Q With regard to the flow of energy, what is your understanding regarding the difference between the action of the two-winding transformer and an auto transformer? *A* In the two-winding transformer, all the energy is converted or reshaped to be more adaptable for the use desired on the secondary side of the transformer. In the auto-transformer only part of the energy is converted or reshaped to meet the desired needs.

Q For what purpose is an auto-transformer most commonly used in a power system? *A* An auto-transformer is ordinarily used only when a [*2707*] relatively small change in voltage is desired, so that only a small degree of adaptation is required of the energy received by the transformer.

Q Are you aware of the fact that at the South Meadow substation there is an auto-transformer? *A* Yes.

Q And will you explain the function, and if you know about it, the necessity for that auto-transformer at that place? *A* The auto-transformer at that station is used to alter the voltage on the lines extending to the Massachusetts line, so that the power received may be connected more readily to the 66 k.v. Connecticut Power bus. The use of auto-transformers for that purpose is rather common. In that case, I do not know definitely why, but in general the answer would be similar, and I think would probably apply. Transmission of power between two stations where the voltage must be maintained cannot always be accomplished in the desired manner without some transformation in voltage. In this case, the lines from Massachusetts bring energy into the State of Connecticut, but they must leave the bus at which the voltage is maintained to meet the conditions in Massachusetts. In order to receive this energy at South Meadow, it is necessary that the voltage be changed to the value at which the South Meadow bus must operate, in order to properly send the energy at that point to the other loads on the system.

[*2708*] *Q* From your knowledge of the particular situation there, and power systems in general, can you tell us what else happens to energy which may be regarded as flowing in the South Meadow substation in relation to energy from other sources? *A* I have already stated that in an auto-transformer energy is at least partially converted. In this case, any energy that is received from Massachusetts is partially converted before it is connected with the Connecticut Power 66 k.v. bus. On one of the 66 k.v. buses, there is an interconnection with the Hartford station, or the South Meadow station of the Hartford Electric Light Company.

There the energy from Massachusetts and the energy from Connecticut are in general intermingled in a manner that cannot be later sorted out as to source. From that point, lines connect to the various loads from which energy which cannot be traced as to source is distributed to the various loads on the system.

Q Would you say that at that point anyway all energy lost all identity as to source, even if it could be traced up to that point? *A* That is my contention.

Q And would you say that that would be so even if the readings of the watt-hour meters indicated flow in only one direction? *A* Yes. I have previously testified to the general principles regarding the possibility of simultaneous flow [*2709*] of power in both directions in any circuit, providing such a resolution meets with the requirements of the system.

Q Now, may any other device be utilized to serve the same function as a two-winding transformer? *A* Yes, although for such a purpose the transformer would certainly be considered to be the most economical and practical means of accomplishing the desired result.

Q What other device might be used for the purpose? *A* One such device is a motor generator set. The motor might be connected to the supply circuit, and would therefore receive energy in the same manner as the primary winding of the transformer. The generator of the motor generator set would be capable of supplying a load connected to its terminals, in exactly the same manner as a load connected to the secondary of the transformer; and the generator could be designed and built for the appropriate voltage, so that it could perform the same function as far as the supply of energy to the load is concerned, as the secondary winding of the transformer.

Q What happens to the energy in the process of supplying a load if the motor generator set is used as you have described? *A* My concept is that the energy is received by the motor in electrical form, and is converted by the motor into mechanical energy. It is implied in a motor generator set that the motor is mechanically

connected to the generator by [*2710*] means of a coupling, belt, gear, or other mechanical means, and the energy is therefore transmitted mechanically from the shaft of the motor to the shaft of the generator. In the generator the energy is reconverted from mechanical energy to electrical energy in order to supply the load connected to the generator terminals.

Q How does this process differ from the process employed in the transformer? *A* The difference is essentially in the intermediate process employed. As I have explained for the transformer, the energy entering the primary winding is converted to magnetic energy in the core and taken from the core by the secondary, and reconverted to electrical energy before transmission to the load. In the motor generator set, the intermediate process of conversion involves a transformation to mechanical energy instead of magnetic energy.

Q If the motor generator set were completely enclosed so that the mechanism was not observable, would it be possible to detect by means of a meter connected to the circuit whether the mechanism of transformation were a motor generator set or a transformer? *A* In my opinion, it would be impossible to determine definitely from any meter readings that the inaccessible device is a motor generator set or a transformer. From the possible meter readings considered as a whole, it would be possible to [*2711*] indicate that some of the characteristics were different from those expected of a normal transformer. But if the motor generator set were designed to perform the same function as the transformers the differences detectable from the meter readings would be matters of degree only, rather than of basic character.

[*2712*] *Q* Now, Dr. Lewis, it has been said that the passage of energy through a transformer is practically instantaneous, is that also true of a generator, whatever may be the source of power for the generator? *A* Yes. Once steady state conditions have been established, there must be a continuous flow of energy in and out of the generator, almost instantaneously.

Q And it has also been said that in passing through a trans-

former, there are very small losses of energy. What have you to say with respect to losses of energy in a generator, regardless of the source of the power? *A* The loss of energy in a generator is usually somewhat greater than in a transformer, but it is still a very small percentage of the total energy transformed or passed through the generator device.

Q You have previously stated that the ability of any circuit to store magnetic energy is measured by a circuit characteristic called inductance. If the inductance of a single-circuit remote from all other circuits is known, how may the magnetic energy stored in a circuit be determined? *A* The stored energy at any instant is equal to one-half the product of this inductance, multiplied by the square of the instantaneous current at that instant.

Q If you had two such circuits, remote from each other, which we will call circuits one and two, each carrying a current, [2713] would the stored energy of each circuit be determined in the manner you have just described? *A* Yes.

Q If the two circuits are brought into proximity with each other, would your answer still be the same? *A* No.

Q Why not? *A* Two circuits physically close together present an interaction on each other which is described by a characteristic similar to the inductance of the individual circuit, known as the mutual inductance between those two circuits. When the mutual inductance between any two circuits is other than zero, the energy stored in the two circuits for given values of current is affected by the value of the mutual inductance.

Q Under the conditions in which the two circuits are close together, how may the energy stored in the magnetic field be determined? *A* Each circuit will have a stored energy equal to the product I previously described, namely one half the product of the inductance of that circuit, multiplied by the square of the current in that circuit. In addition there will be a stored energy due to the mutual inductance, which is equal to the mutual inductance multiplied by the current in the first circuit, and by the current in the second circuit.

[*2714*] *Q* Does this mean that the stored energy, when the two circuits are close together, will be greater for the same values of current in the two circuits when the circuits are close together than it is when the circuits are far apart? *A* No, not necessarily. It may be either greater or less.

Q Why? *A* The mutual inductance may have a negative sign.

Q S-i-g-n? *A* That is correct. So that the energy component corresponding to the mutual inductance may be negative and it will then reduce the total of the energy stored in the two circuits together. On the other hand, the mutual inductance may be considered as positive and the relative directions of the current may be considered to oppose, in which case one of the currents would be assigned a negative value and under this condition the energy attributed to the mutual inductance would again have a negative sign.

Q Assuming that each of the circuits under consideration consist of a single turn or single conductor, and that the cross-section of the conductor is small in comparison to its length, what will happen if the two circuits are brought into close proximity? *A* The self-inductance of the first circuit will approach the same value as the self-inductance of the second circuit, [*2715*] and the mutual inductance will approach the same value as the two self-inductances, although a choice may exist as to whether the mutual inductance is to be considered as positive or negative.

Q If the two circuits are brought as close together as it is physically possible to do so, would it be possible at a point somewhat removed from the conductors, to determine by any magnetic means, whether the magnetic field is produced by two currents in separate circuits, or a single current, having a value equal to the algebraic sum of the currents in the two circuits, flowing in only one of the circuits? *A* No.

Q If the two circuits thus brought together were replaced by a single circuit, carrying a current equal in magnitude in every instant, to the algebraic sum of the currents which had previously been carried by the two circuits, would the total stored energy in

the magnetic field be the same? *A* It would be very nearly the same, the difference depending upon the fact that the two circuits could not be made to coincide exactly and still retain their identity, and this would produce a very slight difference.

Q Let us now return to the two separate circuits physically close together, and assume that the current in one circuit flows in one direction and that the current in the other circuit is slightly less, and flows in the opposite direction. How would the total energy stored in the magnetic field compare with the [*2716*] energy of the circuit carrying the larger current, if the second circuit were completely removed? *A* It would be very much less.

Q Why? *A* Because of the mutual effect in the two circuits that I have described. The energy attributed to the mutual inductance would have a negative sign and would subtract from the energy attributed to the inductance of the circuit carrying the larger current.

Q If the two circuits in close proximity are now brought into coincidence, so that we have in effect only a single circuit, in which the net current is now the difference between the larger current in the one circuit and the smaller current in the other circuit, flowing in the opposite direction, would there be a change in the energy stored in the magnetic field? *A* The change would be very slight, caused only by the fact that the circuits did not originally occupy exactly the same location.

Q If now we consider the two circuits again and the energy which would be stored in the magnetic field if each acted alone, how would the energy so computed compare with the energy actually stored? *A* The stored energy so computed would be very much greater, because it would neglect the energy term due to the [*2717*] mutual inductance which should be subtracted, to properly determine the total energy.

Q How do you explain this action of the mutual inductance? *A* When the two circuits are in close proximity, the magnetic field of both circuits occupies the same space and there is therefore, interaction between the two magnetic circuits, resulting in the

observed fact that the stored magnetic energy differs from the value it would have if each circuit had been considered independently and the energy for each circuit so computed, added together. In other words, two magnetic fields cannot occupy the same space without mutually affecting the energy stored in the common part of the magnetic field.

Q You have previously stated that you believe it possible to consider that two or more currents may flow simultaneously in the same conductor in the same or in opposite directions. Would you not expect that if this were so, the energy loss in the conductor would be the same as would be obtained by considering each of the individual currents separately, and adding the energy losses so determined? *A* No.

Q Why not? *A* In the first place, this would not be in agreement with experimental fact. In the second place, I have just shown [*2718*] that when two magnetic fields overlap or partially occupy the same space, there is a mutual effect between them which alters the energy stored in the field and makes it differ from the value that would be computed if each circuit were considered, or acting separately, one at a time. Two or more currents, flowing in the same conductor at the same time present a very similar problem in that the two currents are now making use simultaneously of the same conductor, and it is therefore to be expected that they would have a mutual effect upon each other which would alter the energy loss when two or more currents flow simultaneously in the conductor.

Q If you assume that there is a mutual effect between two such currents, flowing simultaneously in the same conductor, in the same or in opposite directions, would the energy loss then computed agree with the observed facts? *A* Yes.

Q How do you arrive at that conclusion? *A* Let us assume that two currents are flowing simultaneously, in opposite directions in a single conductor. The power loss due to the first current would be equal to the resistance of the conductor, multiplied by the square of the first of these currents. The power loss due to

the second current flowing in the opposite direction would be equal to the resistance of the conductor, multiplied by the square of the second current. [*2719*] The sum of these two power losses would not agree with the total power loss in this conductor observed by experiment. However, if we assume a mutual resistance, due to the common use of the same conductor directly analogous to the mutual inductance I have previously described for the magnetic circuit, we would have a mutual loss term which, by analogy, should be considered as twice the product of the conductor resistance by the first of these currents going in one direction, and by the second of these currents going in the opposite direction. Since the two currents assumed are going in opposite directions, one of them should be given a minus sign and this product is therefore negative. When this loss is added to the two losses previously computed, the result will be identical with the loss that would be computed, assuming that the two currents are no longer considered to be separate, but are considered to be combined into a single current, equal to the difference between the current assumed to be flowing in one direction and the current flowing in the opposite direction.

Q Is this method of analysis that you have just described in complete accord with your previous statements that the current in a conductor may be divided into two or more components flowing in the same or opposite directions? *A* Yes, the agreement is complete, and I therefore am [*2720*] convinced that there is no method of showing that two or more currents cannot exist independently and simultaneously in the same conductor.

* * * * * * [*2721*]

Q Dr. Lewis, in answer to one of my questions, I think you made the following statement: in answer to a question asking what happens to energy which might be regarded, which may be regarded as flowing to the South Meadow substation in relation to energy from other sources. This is your statement:

"On one of the 66 k.v. buses, there is an interconnection with the Hartford station, or the South Meadow station of the

Hartford Electric Light Company. There the energy from Massachusetts and the energy from Connecticut are in general intermingled in a manner that cannot be later sorted out as to source. From that point lines connect to the various loads from which energy which cannot be traced as to source is distributed to the various loads on the system."

What did you mean there by saying that energy from Massachusetts and energy from Connecticut are in general intermingled in a manner that cannot be sorted out as to source? *A* The two sources are connected to a common facility where the energy occupies some of the same place where the energy may be. We do not definitely know, according to my concept, whether the energy is within the conductor or outside the conductor or where it may be. But when the circuits use common facilities, they must have some joint use of the [*2722*] same facility; whether or not they are mixed together, or whether they are kept separate, we cannot distinguish.

Q I now come to another matter. Mr. Thomas in his testimony, I am referring now to page 1303, defines transmission and distribution, and in the course of that he said, on page 1303 of the transcript:

> "Transmission narrows the operation down to a group of customers so closely associated as to use common distribution facilities without the necessity of considering the element of transmission between members of the group."

I ask you whether you agree with that statement? *A* I would have a question in my mind as to what Mr. Thomas means when he says, "common distribution facilities without the necessity of considering the element of transmission".

Q Why do you say this? *A* As I see it, every circuit of any physical length must consider in its broadest sense some element of transmission, because clearly, if the load is to be supplied, the energy must be transmitted from points nearer to the source, to points nearer to the load, and ultimately to the load itself, and no

circuit can ignore entirely this concept. Even circuits within a private house must consider the element of transmission, in the sense that the size of the conductor must sometimes be increased in order to reduce the voltage drop in the line, even though such a conductor size is not essential to carry [2723] the current without injurious heating.

I would therefore qualify "local distribution" somewhat as follows: Local distribution narrows the operation to a group of customers located in contiguous territory, and involving those circuits and pieces of equipment which may or are designed to serve several customers.

* * * * * *

By Mr. Branch: And again, in speaking of the functions of transmission and distribution, Mr. Thomas, on page 1303 said:

> "In cases where both functions are served by the same facilities, it is considered that a facility is a transmission facility as long as a material part of its utility as measured by the requirements of design depends upon transmission of energy where distance is an obstacle."

Do you agree with that statement of Mr. Thomas? *A* I would not personally agree with it if Mr. Thomas [2724] means to imply that a facility for which a material part of its utility depends upon transmission is classified as a transmission facility to the exclusion of the possibility that it may also be classified as a distribution facility, if any material part of its function is directly associated with distribution. To me, there is no clear line of demarcation between transmission and distribution, and certain facilities might easily be classified as transmission by one engineer, and distribution by another, and I would be unwilling to ascribe to a definition which insists that all facilities are transmission exclusively, if they have any transmission function in the functional sense of the word.

Q I understood you to say, "ascribe". Did you mean "subscribe"? *A* I think "ascribe" would suit my meaning.

Q All right. Do you believe it possible to draw a complete distinction then between the terms "transmission" and "distribution" or "transmission" and "local distribution"? *A* In my opinion, these terms overlap to a greater or less degree. I therefore believe that any sharp distinction between these two terms must be arbitrary, and not of a purely engineering character. It seems to me that this question in many cases depends upon the function the designer had in mind when the facility was designed and built, and it is not possible for someone else to assign a hard and fast function [*2725*] either as transmission or distribution.

Q Have you read Mr. Thomas's description of the facilities of the Connecticut Light and Power Company at Bristol in his testimony in this case? *A* Yes.

* * * * * * [*2726*]

Q Dr. Lewis, in the light of the explanations you have made in your opinion, are the three-winding step-down transformers at Bristol, which convert from 66 k. v. to 13.8 and 4.6 k. v., facilities for transmission or facilities for local distribution of electric energy?

Mr. Wahrenbrock: I object to that question. The qualify- [*2727*] ing phrase in the light of the explanation you have made is obviously an attempt to parallel that language which was used by Commission counsel where the previous explanation had an entirely different effect from any previous explanation which has been made by this witness, unless this witness is to be understood as having adopted a considerable portion of Mr. Thomas's testimony. My fundamental objection to the question as framed, is that it does not state the purpose for which the classification or the description asked is made. I believe that the question as last framed does not restrict the question to the witness's opinion as an engineer.

Trial Examiner: It does not.

Mr. Branch: Well, I will add that, but I will state that the question which you asked and which was allowed didn't state the purpose either.

* * * * * * [2728]

Mr. Branch: I insist that the question is proper, and I will add to it:

By Mr. Branch: *Q* "In your opinion as an engineer."

Trial Examiner: With that understanding, the witness will be permitted to answer the question.

Mr. Wahrenbrock: I except to that ruling, Mr. Examiner.

Trial Examiner: An exception will be noted.

A It seems to me that this transformer, or pair of transformers, is one of those borderline cases that I referred to when I stated that a particular facility might be either transmission or distribution. It seems clear to me from the very fact that two secondary voltages are provided, that there was an attempt to subdivide the power to meet the requirements of the local customers, 13.8 k. v. for the larger industrial customers and 4.6 k. v. for the commercial and domestic customers. This to me is a distribution function.

[2729] I would certainly consider it possible that this might be a completely distribution function on the basis that the C.P. 1 and C.P. 2 lines passing the present substations are delivering power in bulk to the City of Bristol and the step-down transformers are a distribution facility in the sense that they recondition the energy supplied to the 66 k. v. winding into a form most suitable for the connection to the local customer.

By Mr. Branch: *Q* In your opinion as an engineer, in the light of your explanation, is the synchronous condenser at Bristol a transmission facility, as distinguished from a facility for local distribution? *A* If the transmission line, without the use of a synchronous condenser has such poor regulation that the power could not feasibly be transmitted to Bristol, regardless of the other loads along the line, it would seem reasonable that the synchronous condenser might be applied for transmission purposes. On the other hand, if it is found that the power factor of the load in Bristol is relatively low and that it is desired to improve the power factor, in order to minimize the voltage drop in the transformers, and to control the voltage at the substation in order to produce

more nearly constant voltage on customers' lines, it seems to me that the condenser serves [*2730*] a distinctly distribution function, and I certainly could not agree that every synchronous condenser would have to be classified as a transmission facility simply because it is a synchronous condenser.

Q In your opinion as an engineer, are the three-winding transformers, the synchronous condenser, the oil circuit-breakers and disconnect switches for the control thereof, the lightning arrestors, current transformers and other equipment in the substation at Bristol, as well as the steel structure carrying the conductors on the outdoor substation belonging to The Connecticut Light and Power Company at Bristol, transmission facilities, or facilities for local distribution?

Mr. Wahrenbrock: I object to that question, Mr. Examiner, for the same reason that I objected to the first of this line of questions.

Trial Examiner: The witness may answer in his opinion as an engineer.

Mr. Wahrenbrock: Without stating the purpose for which the classification is made?

Trial Examiner: Is the witness in a position to state such a purpose?

The Witness: Yes.

Trial Examiner: All right.

The Witness: From the standpoint of the function which the facilities perform, it seems to me that the equipment referred [*2731*] to could clearly be considered as distribution equipment. I have already explained that the two major pieces of equipment, the transformers and the condenser, might, in my opinion, serve a distribution function, and that in such cases the designer might readily have a distribution purpose in mind at the time the station was built.

* * * * * *

Q When you say "distribution" what kind of distribution do you refer to, if there is more than one kind of distribution? *A*

I am thinking in terms of local distribution to the customers in the immediately adjacent territory of Bristol.

* * * * * * [2732]

Q Would you consider any line in Bristol which went from the substation to a single customer right in the City as a facility for local distribution or a facility for transmission? I am asking your opinion as an engineer, according to the function it serves.

* * * * * *

A As I understand it, the substation at Bristol is very near to the load center of that area and local lines from a substation at the load center to adjacent customers would certainly, in my opinion, be considered as a distribution facility.

* * * * * * [2733]

Cross Examination by Mr. WAHRENBROCK.

Q I direct your attention to Exhibit 82, and ask you if you have examined that exhibit before? *A* I have seen it, yes, sir.

* * * * * *

Q I show you the copy of the Exhibit 82 identified by the reporter, and ask you if you are familiar with that exhibit? *A* I have seen this diagram before, yes, sir.

Q Will you point out, indicate where the synchronous condenser at Bristol to which you have referred is located on this diagram? *A* It is in the lower left-hand corner connected by means of a line through an item which I recognize as a circuit-breaker marked 1629 to the 13.8 k.v. bus.

Q And how is it identified. What kind of a symbol? *A* It is a round circle, with the letter "C" inside, and nearby are the words "10,000 k.v.a., G.E.".

Q Now, in the normal operations of the facilities of the Connecticut Light and Power Company at Bristol, what effect if any, does that synchronous condenser have on the current or voltage in the circuits which lead from the 13.8 k.v. bus [2734] to

the customers? To simplify that question, I will divide it, and ask you what effect does it have on the current in those circuits? *A* The synchronous condenser affects the outgoing circuit only indirectly by having an effect on the voltage which is applied to those circuits, and therefore with the given load connected to them, the current would change as the voltage changes.

Q Does the synchronous condenser have any effect on the currents in the outgoing circuits? *A* As I think I tried to make clear in the previous answer it affects the magnitude indirectly by affecting the voltage which is applied to those circuits.

Q Now, when you say the voltage which is applied, what voltage, voltage in what circuits do you refer to? *A* I am referring to the voltage of the 13.8 k.v. bus which is connected to the outgoing circuits that are shown at the bottom of the diagram in the exhibit referred to.

Q Will you explain the method by which the synchronous condenser affects the voltage in the bus and the outgoing—did you say outgoing or incoming lines? *A* I said outgoing, as I remember, from the 13.8 k.v. bus.

Q Will you explain how the synchronous condenser affects the voltage in the bus and the outgoing circuits? [2735] *A* The synchronous condenser supplies what is ordinarily spoken of as a leading component of current which is added to the current in the outgoing feeders to constitute the total current received from the 13.8 k.v. winding of the transformer. The transformer, in common with every other electrical circuit, has an impedance. The voltage drop through the impedance, and the phase angle it makes at the terminals of the transformer, depend upon the magnitude and phase angle, or power factor, of the total current which flows through the transformer. The result is therefore that when the current is altered or supplemented by the action of the condenser, the power factor of the resultant current in the transformer winding is changed, and the voltage in the transformer, or I should say the voltage drop in the transformer, is thereby altered.

* * * * * *

Q Is the voltage drop in the transmission lines leading to the transformer also altered? [2736] *A* Yes, of course. The voltage drop in any part of the circuit that is affected by the current is altered to a greater or less degree, depending on the impedance.

Q And what is the effect—first, let me ask what is the alteration in the voltage drop due to the operation of the condenser? *A* The voltage drop, if I may speak in vector terms, is a vector whose magnitude is the product of the magnitude of the current and the magnitude of the impedance. Starting at the generating point, if you wish, voltage drop occurs in every element of the circuit, and the vector must be subtracted for the voltage drop corresponding to each element traversed. The angle and the magnitude of the vector voltage drop affect the result that will be obtained after the subtraction has been completed. I may say, therefore, that the condenser affects both the magnitude and the phase angle of the voltage drop, and therefore affects the resultant voltage at every point along the system to some degree from the generator to the point at which the condenser is connected.

Q When you say "affects", is that effect to raise or lower the voltage? *A* In accordance with what I have just assumed, that the condenser was supplying a leading component of current, the effect would be to raise the voltage along the way. On the other hand, every condenser can be operated to provide lagging [2737] current to some degree at least, usually not more than one-half of the leading current, and under that condition the voltage drop may be of sufficient phase angle and magnitude that the voltage is reduced.

Q Do you know how, as a matter of fact, the synchronous condenser at Bristol is operated? *A* Not from actual observation, but I have never yet seen a synchronous condenser which did not operate under both conditions at certain times of the day, depending upon the hours and the load of the system.

Q When a condenser is operating at full load, how is it normally operated? *A* It is normally operated in the sense that I

have described as leading, that is, it tends to raise the voltage at the point where the condenser is connected, in a normal power system.

Q Now, when the condenser is so operated as to supply a leading current, and as I understand you to say, such operation results in raising the voltage on the transmission line, what is the effect of that rise in voltage on the transmission line over what it would be otherwise? *A* I don't believe I can ascribe any particular effect to it, other than the fact that it transmits a load of slightly different character from what it would otherwise have done.

Q Is the capacity of the transmission line to transmit [2738] electric energy greater with the voltage so raised over what it would otherwise be? *A* It may be. I think it is possible to show that if a condenser were operated at full load under certain conditions, the ability of the line to transmit power might actually be reduced. The line will transmit for a given amount of current in the conductor the greatest amount of power when the power factor of the energy being transmitted is at unity. If a condenser has greater capacity than to bring the power factor of the resultant load to unity, the current might be leading, and the ability of the line to transmit, subject to the fact that the current would not exceed a certain value, would actually be less under that condition than at unity power factor.

Q Actually, in normal operation, how are such condensers operated at full load? *A* It depends upon the system. Largely upon the length of the transmission line. For long lines, such as those existing in the West, it is found desirable to operate the condenser so that the power factor at the receiving end of the line is considerably leading. That is, there is more reactive current in the leading direction than necessary to reach unity power factor. As the length of the line, which of course is a characteristic of its impedance, is reduced, there is a tendency to reduce the amount of condenser capacity so that the load current supplied is more nearly at unity power [2739] factor.

Q Under the conditions prevailing at Bristol, how would a synchronous condenser normally be operated at full load? *A* I do not see that that question can be answered from consideration of the Bristol load alone. This line to which the Bristol substation is connected, or pair of lines, is connected to a number of other loads, and to at least two generating stations. The operation of the condenser normally would depend to some extent at least on what is the normal practice, or what is the operation at the particular time of the other stations connected to that circuit.

Q As a matter of fact, isn't the Bristol condenser operated to raise the voltage on the transmission line? *A* It would normally be, at times of heavy loads. I would expect that at light load, the load on the condenser would be reduced to a small amount, or may be made lagging reactive.

Q Well, when you said that the current in the outgoing circuits from the 13.8 k.v. bus was affected by the operation of the condenser due to the increased voltage, were you referring to this increased voltage to which you have just referred? *A* I was assuming that that was the case, that the condenser was being operated in such a direction, or such a manner, [2740] as to increase the voltage, since that would normally be the function that you would wish to perform at times of heavy loads.

Q I understood you in your direct examination to refer to a load center at Bristol. What did you mean by load center? *A* Load center is a term which is used to define approximately the geographical or electrical center of an area which is to be supplied.

Q And where is the load center in Bristol? *A* I cannot define it exactly. It would change from time to time, and the designer of the station or of the system would endeavor to locate a station as near as possible to where he expected the electrical center of the system to be. By electrical center, I would mean that if there were expected to be two loads at opposite ends of the town of approximately equal magnitude, then the load center would be at the point half way between. If the load at one end were greater,

and the load at the other end were smaller, the electrical center would move toward the greater load. With a number of loads expected, the process is difficult to apply exactly, but would be applied approximately, and then the effort would be made in general to locate the station as near as possible to where that point was estimated to be.

Q Do I understand that you have by personal study determined where the load center at Bristol is located? [*2741*] *A* No, sir.

Q Have you studied any data which locates that load center? *A* Not exactly, no, sir.

Q Do you know whether all of the customers served by the Connecticut Light and Power Company from its Bristol substation are located in contiguous territory? *A* It is my understanding that the longest line leading from this substation is approximately 4.2 miles long, and that that is one of the 4 6 k.v. circuits. I would consider that contiguous territory.

* * * * * [*2742*]

Q Have you actually viewed the territory to ascertain whether the areas in which the customers are served are contiguous to each other or whether there are intervening areas in which customers are not served? *A* No, sir, I have not personally viewed it. I have heard the matter discussed and have listened with that point in mind.

Q Then your statement with respect to contiguous territories is not based upon your personal study or knowledge? *A* It is based only on the general discussion of that area which I have been listening to since I was called to serve on this case.

* * * * * * [*2745*]

Q How do you describe an electric current? *A* An electric current is a physical phenomenon observed by its other manifestations. It may flow in a metallic conductor or in a gas, or a liquid. In all cases, an electric current produces in its neighborhood a magnetic field which will affect magnetic material. It was observed by its effect upon a compass needle, in the neighbor-

hood of a wire carrying what we have come to call an electric current.

Q Now, what is the physical phenomenon which is the electric current? *A* I don't believe that it is definitely established exactly the physical phenomenon that takes place, but it is fairly well established that all matter is made up of particles called atoms, and that the atoms are subdivided further into smaller particles, consisting first of a nucleus, considered [*2746*] to be at least near the center of the atom, and the nucleus is surrounded by a group of negatively charged particles in the sense we have described them, called electrons. In certain substances the electrons are attached rigidly to the nuclei, and are detached only under the effect of very strong forces. In certain other materials, notably the metals, it is the conception that the electrons are relatively free to be detached from the atoms of which they may originally have formed a part, and to be subject to motion. The motion of the electrons constitutes the electric current. The electrons, as the present theory is believed, or states, are moving in all directions more or less indiscriminately under the effect of electric forces. The net flow of electrons is somewhat greater in one direction than it appears to be in the other, and we say that we have an electric current flowing in one direction.

Q What is this electric force that you refer to? *A* I think we will have to begin by discussing the constituents of matter. As I have stated earlier, matter is composed of discreet particles called atoms, comprising the nuclei, and the electrons surrounding them. When the electrons and the nuclei are separated, there appear forces tending to restore them. In the region where this separation has been accomplished, we have what is known as an electric field, and in this region any other negative or positive particle would be acted upon by a force. That is what I mean by [*2747*] electric force.

Q Is that the same as electromotive force? *A* No, it is not. Electromotive force is something quite different.

Q What is electromotive force? *A* Electromotive force is one

example of voltage, so that I think I will have to first tell you what I mean by voltage. In any electric field which I previously described, there will be forces at the points of the field. If you are to start with a unit charged positive particle, and move it against those forces from one point to another, you will have to do work, and the work necessary to move a unit charged particle from one point to another is called the difference of potential, or the difference of voltage between those two points. An e.m.f., or electromotive force, is a particular kind of voltage. It is used loosely in electrical engineering in the sense that sometimes a voltage is described as an electromotive force by some people, and other times it is described as a voltage due to mutual induction, or something of that sort. The general distinction that I have is that an electromotive force is a voltage due to something more or less external to the particular circuit in which the voltage you are discussing appears. I may further characterize it this way. In a battery, the difference of potential arises from [2748] chemical action, and we say that that is a chemical electromotive force because the chemical properties of the battery are somewhat distinct from the circuit in which that voltage tends to produce a current. In a generator, the voltage generated by the action of the rotating field, if you are considering the usual alternating current generator, is considered by many to be an electromotive force because the field which is producing the voltage is external to the circuit in which the electromotive force is being produced. In another analysis of generators, we may say that the voltage is produced by mutual inductive action between the field and the armature winding of the generator, and in that sense it would not be an electromotive force, because its two circuits are magnetically coupled together, and the voltage is due to magnetic action, so that in that sense, the electromotive force in not precisely defined, but is in a sense a type of voltage which is essentially produced by something external to the circuit in question at the time.

Q Is current the result of the application of voltage? *A* Current cannot flow without the application of one or more voltages.

There may be one voltage, or there may be several voltages in any single circuit, and current is the result of the application of all of the voltages which are present in the circuit in which it flows.

Q Is that true if we have two voltages separately con- [2749] tributed to a particular conductor there is one current from the application of those two voltages separately contributed? *A* In order to answer that, I think it is necessary to define more precisely the circuits. If we have only a single circuit, and the voltages in question are in series in that circuit, there would be a single resultant current flowing in the circuit. Whether you said it was a single current, or two separate currents flowing as a result of two separate voltages would be a matter of discussion.

Q In any case, the current in a conductor is the excess of the electrons moving in one direction over the electrons moving in the opposite direction? *A* That is my conception, yes.

Q Would you speak of that excess as a net, or a resultant of the movement of all of the free electrons in the conductor? *A* That is my conception, yes. They are moving. With the conductor carrying no current, they are moving in both directions, in equal numbers statistically. When the current flows, there is an excess of flow in one direction over that in the other.

[2750] *Q* Well, now, when we have two sources of supply of current to a single conductor, how would you explain the movement of electrons in that conductor as differentiated from the condition where there is only one source of supply of current to the conductor? *A* In the conductor where both currents are presumed to be flowing, there will be a net flow of electrons which does not distinguish as to whether it is a single current or two currents or more currents which make it up. I can't identify the electron as belonging to a particular current and yet I cannot say that it does not.

Q They are indistinguishable? *A* As far as I can see they are indistinguishable.

Q They do not preserve any relation with reference to each other, any physical or spacial relation with reference to each other?

Mr. Branch: I object on the ground that it isn't quite clear what "they" refers to.

Trial Examiner: Clarify what you mean by that.

Mr. Wahrenbrock: The electrons moving in the conductor as a result of the supply of current from two sources.

* * * * * * [2751]

A I cannot see that they maintain any fixed spacial relations. Does that answer your question?

By Mr. Wahrenbrock: *Q* I am interested in ascertaining whether as that movement continues through a conductor there are any laws governing the relation of those movements of electrons to each other? *A* The relative motion of the electrons at any particular point in a conductor depends upon the electric force at that particular point in the conductor, and that is the resulant effect of all the electric charges in any part of the circuit whatsoever. So that as far as any particular point is concerned, I don't see that you can say anything about an attachment of that electron to anything except the whole circuit, and not to its immediately adjacent neighbor.

Q Well then, when you have two sources supplying current to a conductor, do I understand that you would say that the resultant current in the conductor is the resultant of both sources, as though both sources are mixed in the conductor; you cannot distinguish or attribute the resultant current, or any part of it, to one source or the other? *A* I don't see that you can make such a statement as that. Let me illustrate what I mean. Let us suppose that we apply one source of potential to the conductor alone. The effect of that will be to cause a migration of electrons in the proper direction along the conductor, in accordance with [2752] that electromotive force or source of voltage, whatever it may be. That does not tell us at all that electrons did not go in the opposite direction; in accordance with the theory I have explained, which we believe to be true, there are still electrons moving in both directions, and it is the net excess of flow in one direction as com-

pared to the other which constitutes the electric current. Now, let us suppose that we independently apply another source of potential to that conductor. There will be another mass migration of more electrons, in one direction, than there is in the other. If both sources of potential are applied simultaneously, there will be an increased motion of electrons net in one direction if the two currents are tending to flow in the same direction than there was before. The net motion of electrons is the same, whether you consider that what you have got is one current or whether it is two separate currents that you previously had.

Q Well, you don't have a picture, do you, of two separate streams of electrons moving in the conductor as a result of the two separate potentials applied simultaneously? *A* They are not separate, inasmuch as they use the same space within the conductor.

Q The electrons which are moving predominantly as a result of one source of supply—

* * * * * * [2753]

Q (Continuing) —are moving in the same areas of the conductor as those which are moving as a result of the current flowing from the other source of supply? *A* The current occupies the entire conductor. We don't know just exactly the constituents of the matter that tell us how it occupies the conductor, but at least we know that if the current flows in the conductor, it spreads out to occupy the entire conductor. Any other current flowing in the same conductor would do likewise.

Q Well, I find it difficult to get a picture of just what the action of these electrons is. Is it reasonable for me to picture two flows of vibrating or drifting electrons passing along side by side without mixing with each other? *A* It is awfully hard to give a picture of something that we know so little about, but we have this concept. The electrons certainly do not move as fast as the current is presumed to flow, approaching the velocity of light. The electrons drift along the conductor very much more slowly.

Now, whether the same electrons drift faster, or other electrons drift along together with them, or whether still [*2754*] other electrons are detached from the atoms and flow as a result of the second current that you are referring to, we have no means of knowing.

Q Well, they are then, as I get the picture, whether they behave in one way or the other, their actions are mixed? *A* Well, in certain sense I would say they have to be. They are electrons in the same conductor, within the same dimensions, they are spread over the entire cross-section, so that they are in the same restricted volume at the same time, so that in that sense certainly they must be mixed.

Q Depending on these several theories that you have suggested, that they may not move as fast as the speed of light and they may drift or they may vibrate or one may affect successive ones, that is taking place helter-skelter? *A* That is my conception of it, yes.

Q In your direct testimony, you have shown electric energy as being associated with current. Will you explain what you mean by that? *A* If we can segregate a little portion of the circuit, in order to talk about it, in which at least one conductor goes in and one comes out, if there is current flow in the conductor going in and a corresponding current in the other conductor flowing out, and if there is a difference of voltage between those two conductors as they enter the region, we can find by experiment that energy must enter that region coming from [*2755*] an outside source. It flows when the current flows. That is, we find that energy comes in when the current is flowing and the voltage is maintained; it stops when the current is stopped. We don't know how it gets there, except that I have just told you the experimentally observed fact.

We therefore say that in the face of those facts, when the current flows and the potential is maintained, there is a flow of energy electrically from one side of the region to the other side of the region where our measuring instruments are located.

Q Well, is electric energy something that has shape? *A* No.

Q Or form? *A* Not that I know of.

Q Well, what do you mean when you speak of electric energy as being reformed or reshaped? *A* As I have told you, electric energy must be accompanied both by the presence of voltage between the conductors in question and the presence of current within the conductors in question. Under those conditions, electric energy is present. However, if you change the voltage of the current, the form of that energy and its ability to do work is not the same as it was before.

Q Well, what do you mean by "form of the energy"? *A* Well, I have just described the energy as being char- [2756] acterized by the presence simultaneously of voltage and current, so that the three, the energy, the voltage and the current, are definitely tied up together. Without the three of them, you do not have a complete system.

Now, if the voltage is changed--and let us say it is increased—the current is proportionately decreased in order that you may have the same total amount of energy.

We may therefore have the same amount of energy and yet have a different voltage and a different current, the three being tied up together, and when voltage and current have been changed from their previous form, I say that the energy has been reshaped.

Trial Examiner: Were you through with your statement?

The Witness: Yes.

Trial Examiner: Do I understand you to mean in that that the amount of energy does not change?

The Witness: Well, I had to assume something constant in order to talk about it. I said, "Let us assume" or intended to say "Let us assume"—that we had the same amount of energy and changed the voltage. Then if we changed the voltage the current must be proportionately changed in the opposite direction, in order that the energy should remain the same.

Trial Examiner: Isn't that what happens in the case of a transformer, that the amount of energy does remain the same?

[2757] The Witness: Except for the losses within the transformer.

Trial Examiner: Except for the transformer losses. Then you could say, could you, that except for the transformer losses the product of the voltage times the current, times the power factor in the primary, would be equal to the product of the voltage times the current, times the power factor in the secondary?

The Witness: That is correct.

Trial Examiner: That answers my question.

By Mr. Wahrenbrock: *Q* And do I understand that when you speak of reshaping or reforming, you simply mean that the energy remains the same except for transformer losses, the ratio of voltage to amperage varies? *A* Right.

Q And is that the whole of what you meant by reshaping or reforming electric energy? *A* Well, the concept that that implies. For example, let us assume that we have a lamp that is to be supplied. We also have an electric line nearby which, let us say for the purpose of making it definite, is a 13,800 volt line. Energy is available in that line, yet we know that if we connected the electric lamp directly to that line it would not operate properly. We then have to do something to the available electric energy in [2758] order to make it adaptable to the lamp that we are going to use it with. In that sense we have altered its form, so that it will apply properly to the electric lamp with which we wish to use it.

[2759] *Q* Does the ordinary power transformer do anything to voltage or current or to electric energy which can't be undone by another ordinary power transformer? *A* Except for losses, certainly not.

Q You could always, except for losses, restore the current to the original current, or the voltage to the original voltage? *A* That is correct.

Q Approximately what percentage of the full load output of a commercial power transformer is the amount of exciting energy stored in the core of the transformer at the instant of the maximum

storage? *A* I don't believe I could answer that without a calculation. The net amount which may appear there, total at any particular point, or any particular time, I should say, is probably less than the full load output of the transformer.

Q Would it be in the order of two per cent? Would you like to make the calculation with a piece of paper? *A* If you wish.

* * * * * * [*2760*]

The Witness: That question as you have phrased it cannot be answered, because energy which you have asked for is measured in units of energy, and the output of the transformer is measured in units of power. However, may I suggest that I try to answer that question by expressing the ratio of the reactive power in the transformer corresponding to the energy storage. Would that be satisfactory?

By Mr. Wahrenbrock: *Q* Well, I think if my question is modified so as to be limited to one cycle, it will be susceptible to an answer, would it not? *A* I would have difficulty with it because the energy stored at an instant is an instantaneous phenomenon, and does not apply for a full cycle. The output of the transformer is a power rating which applies at all times.

* * * * * * [*2761*]

Q What I wish you would compare is the amount of energy stored in the core at the moment of its maximum storage, with the amount of the output of energy of the transformer during the cycle? *A* I think in those terms that I have material enough in mind that I can answer. For the average power transformer, I would give a figure of approximately eight per cent stored in the transformer of the output.

Trial Examiner: By that you mean the output of one cycle?

The Witness: In the corresponding interval of time, yes.

By Mr. Wahrenbrock: *Q* Is the energy stored in the core of the transformer limited to the exciting energy? *A* I didn't intend to mean it to be so. In the usual description of a transformer, we speak of the exciting current, [*2762*] which represents the nor-

mal magnetic path, and we also speak of the leakage reactant, which includes the other paths outside of the core of the paths for magnetic flux, outside of the core of the transformer, and energy is certainly stored in that part of the transformer as well as in the core itself.

Trial Examiner: Do I understand the eight per cent to which you refe red is the amount stored in the core or in the transformer as a whole?

The Witness: I intended to mean the transformer as a whole.

By Mr. Wahrenbrock: *Q* What is the current in the primary at no load as compared with full load, in the ordinary well designed commercial power transformer? *A* By that I interpret your question to mean you wish to know the ratio of what is normally called the exciting current to the rated current of the transformer. On a typical well designed transformer today I would estimate that as approximately four per cent.

Q Is the answer you gave to my previous question about the amount of energy stored in the transformer based upon your assumption that the exciting current would be limited to about four per cent of the total? *A* I was basing it upon the same transformer, but considering it from the standpoint of full load rather than no load.

Q And for the purpose of giving that eight per cent [2763] figure, you considered the exciting current as amounting to about four per cent? *A* Yes.

Q Does the exciting current measure the stored energy as long as the supply voltage is the same? *A* I don't think it does.

* * * * * * *

Q Will you explain what you mean by that answer? *A* I have already explained that there are leakage fluxes within the transformer which appear under full load conditions that are not present under light load conditions. I have obtained four per cent additional, if you wish to have it in that form, as being based upon the energy stored in the leakage paths.

Q Is there a difference between the quantity of energy stored in the transformer at the point of maximum storage, and at some other time in the cycle? *A* Yes.

Q What is the difference? *A* The energy goes each cycle from its maximum value to zero, and back again.

[2764] *Q* The amount of energy stored? *A* That is correct.

Q Which you say at the maximum amounts to eight per cent? *A* That was my estimate of the ratio, yes.

Q In your direct examination I believe you said that many engineers believe that some of the, what you refer to as component currents, have separate existence. Am I right in that recollection of your testimony? *A* It sounds correct to me.

Q I don't believe you stated whether you believed that any of these component currents have separate existence. *A* I have tried to state in my testimony that that was a possible explanation, which was in agreement with all the facts, and that it was useful and that I used it in describing current the way I did. It is difficult to say that two things which occupied the same place in the mechanism of which I have described current are actually and entirely distinct or entirely mixed or combinations, but I have said that I could assume them to be distinct and reach all the correct results.

Q That assumption of independent existence is one, I believe, which you said is not susceptible to proof by physically observable facts? *A* That is correct.

Trial Examiner: Do I understand you to mean that it is not [2765] uniquely demonstrable, that other hypotheses may be equally sustained by the same observable facts?

The Witness: I think that expresses my position, yes, sir.

Trial Examiner: Thank you.

By Mr. Wahrenbrock: *Q* I wish you would explain a little more fully the method by which you would connect to a circuit carrying a three-phase current, the filters that you spoke of, for the purpose of your direct testimony. *A* Would I be permitted to use a textbook in which they are explained?

Q Surely. *A* I have one. I refer to a standard textbook entitled "Symmetrical Components", written by Messrs. Wagner and Evans of the Westinghouse Electric and Manufacturing Company, with whom I was associated, at the time of its preparation, published by the McGraw Hill Company in 1933. There is a whole chapter in the book devoted to measurement of sequence voltages, and sequence currents, which contains many such networks and their method of connection. It is chapter 14 and begins on page 271. If you wish, I will try to explain how one of those works, or I can refer you to the text wherein it is explained quite fully.

Q I wanted just a brief outline of the method of connect- [2766] ing the filters, and briefly how they work. I don't think we need a whole chapter of a book. *A* Well, is there any part of the chapter you wish? The filter consists of a series of reactors and resistors properly proportioned so that currents will flow in them in the desired manner. This series of reactors or resistors is internally connected and you might say is usually put up in a box, to which there are three terminals, one for a voltage measuring device and two terminals for the meter. The three terminals of the network which are intended for connection to the line, one is connected to each phase of the three-phase line. The remaining two terminals are connected to the meter. One of the simplest methods for measuring positive sequence voltage consists of a resistor and reactor in one leg, and a pure resistor in the other leg. In order to show their connections, I am afraid I would have to have a diagram that is the same as the one in the text.

* * * * * * [2767]

The Witness: Mr. Examiner, I have just completed the sketch of positive sequence filter or network, which is in accordance with figure 148 of Symmetrical Components, by Messrs. Wagner and Evans. By the use of the sequence filter or network, shown on the sketch, it is possible to connect the three terminals marked line terminals to the three-phase conductors of the three-phase [2768] system, and to connect the two terminals marked terminals for

network to a suitable meter, and calibrate the meter so that the indication on the scale corresponds to the positive phase sequence component of the voltages of the three phases.

* * * * * *

Mr. Wahrenbrock: To the reporter for identification, and I hand one copy to respondent's counsel, and keep one for myself, and ask that it be identified as Exhibit No. 84.

Trial Examiner: It may be marked Exhibit 84 for Identification.

(The document referred to was marked as Exhibit No. 84 for Identification.)

* * * * * * * [2769]

By Mr. Wahrenbrock: *Q* I wish to refer to that part of your examination in direct where you compared the operation of a motor generator set with the operation of the transformer at South Meadow, I believe, and ask you whether such a motor generator set would not require a source of direct current, in addition to the alternating current now supplied to the auto-transformer? *A* If you are inquiring into the method of operation of the motor generator set, such a motor generator set which would perform the operations I described would require direct current for its proper operation. However, that direct current could be provided by means of one or more direct connected exciters which are a part of the motor generator set.

Q I understand that a transformer does not require a direct current source of energy in addition to the alternating current supplied to the transformer? *A* That is correct. The necessity for the direct current is for the conversion to mechanical energy, which is the fundamental process of the motor generator set, which differs from that of the transformer.

Q Would the operation of the motor generator set involve a flywheel effect which would be different from the effect of the operation of a transformer? *A* I think that is correct, although I believe I stated [2770] that once steady state conditions had been established in the motor generator set, the differences would not

be detectable by external measurement. The flywheel effect would not be present except during transmission from one steady state condition to another.

Trial Examiner: I would like to ask one question while you are on that. There was some question in regard to operating losses in the use of a motor generator. Would those operating losses exceed those in the transformer?

The Witness: Certainly.

Trial Examiner: About what would the ratio be?

The Witness: At least four times as large.

Trial Examiner: That answers my question.

By Mr. Wahrenbrock: *Q* In considering the nature of the facilities at Bristol, I would like to ask you whether, if instead of obtaining the electric energy to supply Bristol from the present source, a generator or several generators had been provided at the load center in Bristol, those generators operating at a voltage of 13.8 kilovolts, under such circumstances would it have been necessary to install the three-winding transformers which were installed? *A* No, because the voltage of the generator has already been adapted to the load it desires to supply. However, it would have been necessary to incorporate under the conditions [*2771*] you stipulate a transformer to transform from 13.8 k. v. to 4.6 k. v. and that transformation is incorporated in the three-winding transformer that is there at the present time.

Q If, as a matter of fact, there had been generators supplied with a voltage of 13.8 k. v. and other generators with a voltage of 4.6 k. v., then no transformer whatever would have been required? *A* Assuming that the generators at 13.8 k. v. were always adequate for the load at 13.8 and correspondingly at 4.6.

Q And under the conditions that I have stated, that is, where a generating capacity is provided at the load center in Bristol, would it have been necessary to provide the synchronous condenser? *A* That may or may not have been so. I was told of an installation in the State of Connecticut where that has been done. I have in mind an article written by Mr. C. M. Lafoon, of the Westinghouse

Electric and Manufacturing Company, in which he proposes just exactly such a thing to increase the capacity of the generator. The question of whether or not it would be necessary, depends upon whether or not the generator had been designed to provide that capacity inherently.

Q With generators operating at normal capacity, would the use of a synchronous condenser be necessary? *A* I again state that that is a question of how the genera- [2772] tor may have been designed. In the case that I mentioned, it is my understanding that the generator had a capacity of so many k. v. a's. Because the turbine in question had a greater capacity than that for which it was sold, it was possible to increase the capacity of the turbine and generator to the maximum permissible k.v.a. of the generator, by supplying the reactive k.v.a. by means of a condenser connected at the same point.

Q Isn't that a very unusual kind of design? *A* I would say it was unusual, because it is possible to combine the functions of the condenser and the generator, if one wishes to do so, and it is economic to do it, so that normally, unless conditions change from those which are anticipated, or unless the maximum possible capacity is reached, due to some mechanical limitations, there would be no economic advantage in so doing.

Q In your direct testimony you referred to what I might designate as the increment of load theory, with respect to what you said was the practice of load dispatchers, under some circumstances. Do I understand that you say that is or is not used to trace the flow of energy from particular sources to particular loads? *A* It is used as one of the ways in which a load may be assigned to a particular generating station. I have testified, I believe, that that method is no more provable [2773] than any other.

Mr. Wahrenbrock: No further questions.

Trial Examiner: With regard to Exhibit 84 for Identification, I wonder if the witness would make for the record a statement of the meaning of the various symbols.

The Witness: I will attempt to do so.

* * * * * *

The Witness: The symbols inside the dotted line on the diagram represent the element of the filter or network which selects the positive sequence voltage component. The symbol marked "Z sub A" represents an impedance consisting of a resistance and a reactance. The symbol "Z sub B" represents a resistance alone whose magnitude is characterized by the letter "R". Returning to the impedance Z sub A, the resistance is one half the resistance R, and the reactance has a magnitude equal to .866R. With these values of resistance and reactance, the impedance Z sub A has the same magnitude as the impedance Z sub B, but has a phase angle of 60 degrees. Below the figure I have written down equations by which it may be deduced that the current through the meter is proportional [2774] to the positive sequence voltage. In the first equation the current in the meter is indicated by "I sub M". The voltage between phase conductors C and B is represented by the symbol "E sub cb". In the denominator of the first fraction we find R, epsilon to the power j60, which is the mathematical representation of the impedance Z sub A, which is connected across the phase voltage E sub cb, with the aid of a voltage transformer. The remaining fraction in this first equation consists of the voltage E sub ao, between the phase conductors and C divided by R, which is the value of the impedance Z sub B. In the next two equations the two voltages referred to are expressed in terms of the positive sequence voltage, E sub 1 and the negative sequence voltage E sub 2, each multiplied by the appropriate factor in which the expression "a" represents epsilon to the power j120, or it corresponds to a vector operator which performs the mathematical function of rotating a vector quantity 120 degrees. In the next equation these values are substituted in the first equation and in the following line the value is given, which is obtained on reducing the equation just mentioned. It can be shown that the last parentheses in the equation just above for I sub M reduces to zero, so that the factor [2775] multiplying the negative sequence volt-

age becomes zero and the current in the meter does not correspond to any proportion of the negative sequence voltage. The current in the meter is given as equal to three times E sub 1 divided by R. Upon proper calibration, the meter may be made to read directly in volts. I neglected to point out that two potential transformers which may be of any suitable ratio, so long as they are the same, are included in the filter, as represented by the conventional symbol for potential transformers or other transformers, as far as that use of the symbol is concerned. I also see that in tracing the carbon I did not trace through the circle around the letter "M" which represents the meter. If I may be permitted to do that, I can correct the copies.

Trial Examiner: We will permit the witness to correct those copies by inserting a circle.

* * * * * * [2776]

Redirect Examination by Mr. BRANCH.

Q There has been some questioning on cross-examination in regard to the synchronous condenser at Bristol. Is there any other facility or type of facility which might be used to accomplish the same purpose? *A* At the present time the result might be accomplished in several ways.

Q Will you explain them, and indicate the place where the facility would be located? *A* The ideal way for this power factor correction to be accomplished would be for the users of the power to provide synchronous motors instead of induction motors, so that the power factor of the load drawn by the customers can be made more nearly unity power factor than is encountered in most industrial loads. This would obviate the necessity for any external means for power factor correction.

Q And those motors would, of course, be located in the premises of the particular customer, would they not? *A* Yes. I have said that those would be the customers' loads, and therefore would have to be located in the customers' premises. If that were done, there would be little, if any, need of power factor correcting

equipment external to the [2777] customer. However, in many cases, customers cannot be required to use such motors by the rules of the power company, and induction motors having low power factor are used. In such cases, the power factor can be corrected equally well by means of static capacitors instead of synchronous condensers, and the static capacitors may be located at various points along the line. The closer they are located to the customer's premises the more satisfactory the power factor correcting operation.

In 1928, which as I understand is the date the Bristol synchronous condenser was installed, these static capacitors were not commercially economically available. The price of such capacitors has been reduced steadily in the last fifteen years to the point where they may now be used as economically in many cases, and even more so in a considerable number of cases, as a synchronous condenser to perform the function of power factor correction.

* * * * * * [2782]

CALVIN T. HUGHES,

a witness previously sworn, resumed his testimony:

Cross Examination (Continued) by Mr. WAHRENBROCK.

Q Mr. Hughes, I believe that you spoke of having designed the Bristol substation. *A* Yes

[2783] *Q* Is there anything about the design of the Bristol substation, that is, that you designed uniquely to handle the current from any particular source, or energy from any particular source? *A* Do you mean by that a particular type of energy, or as the design is determined by the area or the circumstances surrounding that particular place?

Q Well, I wish to know whether in your design of the substation, you designed the substation in a unique way to handle electric energy from any particular source? *A* Well, the source was established. I mean, so far as the transmission lines existed there at Bristol, at the time my work started; there was an existing

present line in Bristol, so my problem was to install at the receiving point there at the substation, and design—

Q Do I understand you designed the substation to operate with electric energy supplied to it from the C.P. 1 and C.P. 2 lines? *A* That is right.

Q Do I understand that you designed it to be supplied with electric energy over the C.P. 1 and C.P. 2 lines from any particular source? *A* I don't know that that came into the problem at the time. It was—When you say "any particular source", any source that arrived with energy of 66,000 volts or thereabouts, [*2784*] at the substation, would have been satisfactory.

Q So that, when on direct examination you stated that the substation had not been designed uniquely for the utilization or the distribution of electric energy from a source outside the State, you could just as well have said that it was not uniquely designed to handle electric energy from within the State, could you? *A* No, I couldn't, because I was generally familiar with the source of power that was available for Bristol.

Q Well, didn't I understand you just now to say that it didn't make any difference what the source was as long as it came over the C.P. 1 and C.P. 2 lines? *A* Not exactly that, no.

Q Now, what is the difference between energy delivered to the Bristol substation, which has its source outside the State, and that which has its source inside the State? *A* What is the difference between the energy?

Q Yes. *A* I don't know if there is any difference.

Q Well, would it have required any difference in the design of the Bristol substation to handle electric energy from outside the State from the design which you adopted? *A* That didn't enter into the problem. That didn't enter into the problem.

Q And it would have made no difference in your design? [*2785*] *A* Since I didn't have to consider that problem, it wasn't part of the problem.

Q Your problem was limited to taking whatever energy was delivered over the C.P. 1 and C.P. 2 lines? *A* That is correct.

Q And the source of the energy delivered over the C.P. 1 and C.P. 2 lines did not enter into your design problem? *A* Not particularly, no.

Q Well, you say "not particularly". Did it enter in at all? *A* Well, it entered in only so far that on a project of that magnitude and requiring that amount of power, you would at least see if there was a source available.

Q In the design of the station, did you assume that there was a source available to supply electric energy over the C.P. 1 and C.P. 2 lines? *A* Yes.

Q Then the location of that source didn't enter into your design problem at all? *A* We did know that there was a source. We did know that the power would be available.

Q You knew that there was a source, but did the location of that source affect your design? *A* Not particularly, no, not in detail.

Q Well, did it affect it at all? [*2786*] *A* Well, if there had been different sources further away, it could have affected the design.

Q And do I understand that in your design of the station you started with the assumption that electric energy would be delivered from some source over the C.P. 1 and C.P. 2 lines? *A* That is right.

Q Did you in your study and design of that substation consider any alternative source of supply? Did you consider for example the building of generator capacity in Bristol? *A* Well, of course that was quite a while ago. We didn't consider the building of generator capacity in Bristol. We did consider generally the possibilities of supplying that load from the main system of The Connecticut Light and Power Company.

Q Did I understand you to say that you did not consider installing generator capacity in Bristol? *A* We did not, but we did give some thought and consideration to the possibility of supplying it from the main system of The Connecticut Light and Power Company.

Q In designing that substation, what determined the primary voltage which you selected for the three-winding transformers? *A* By primary, you mean the 66,000 volt voltage?

Q What is now the 66,000 volt voltage. What determined that you would make it a 66,000 volt primary? [2787] *A* That was the voltage of the then existing line of the C.P. Company from which we obtained the power for Bristol.

Q And you made the primary voltage of the transformer 66,000 in order to adapt the transformers to the 66,000 volt lines? *A* Well, where you make a transformation between a source and a load you of necessity use the voltage that the power is delivered at.

Q The voltage of that primary was in no way determined by the distribution problem in Bristol? *A* Yes, because that was part of the distribution problem.

Q Well, how did your distribution circuits and their voltages affect the voltage of the primary? *A* Because you cannot have a transformer without a primary and a secondary, or the equivalent of it. If you receive energy at a point where you want to distribute it, and it is more economical to change that voltage or more feasible or practicable, well then, you change the voltage, just the same as you change the voltage in a customer's house, change the voltage from the circuit in the customer's house to a bell-ringing transformer.

Q If the C.P. 1 and C.P. 2 lines had been operated at 110,000 volts, what voltage would you have designed or ordered those transformers for? *A* Had we received power at 110,000 volts, it would have [2788] naturally followed that the winding that connected to that point of receipt would have been for 110,000.

Q If the distribution voltage in Bristol had been 6,600 volts, would that have affected the voltage of the high-tension side of the transformer? *A* No.

Q The fact that the distribution voltages were 13.8 and 4.6, and I believe in one case 2.3 k. v., didn't affect your determination of your selection of a 66 k. v. as the voltage of the primary, did it? *A* When you speak of voltage alone, no. The transformer

as a whole, it did affect—the transformer as a whole, that is, the amount of load and the voltages between the point of receipt and the points that we wanted to spread out, yes.

Q But the voltage of the primary was not affected by the distribution of voltages which you had to supply? *A* The voltage of the primary, as I have said, was to take the power as we received it.

Q If you had designed that substation so as to utilize steam generating capacity installed in or near the load center at Bristol, would it have been necessary for you to provide a transformer to step the voltage down from 66,000 volts?

* * * * * * * [2789]

The Witness: I might state it this way: One of the problems in the layout of the various apparatus at the Bristol substation had to take into account the fact that there was a steam generating plant there at the time, with some small turbines, boilers, and so forth. If I understood the question, you want to know if it would have been any different in the primary winding had there been a steam generating plant there. Do I get it right?

By Mr. Wahrenbrock: *Q* I will reframe the question, Mr. Hughes, to try to eliminate any uncertainty. Assuming that you had fully adequate generating capacity at your distribution voltages, would it have been necessary for you to provide the three-winding transformers? *A* If we had had a good source of power, a firm source of power at Bristol, no.

Q The three-winding transformer was then installed, in order to utilize the energy supplied over the C.P. 1 and C.P. 2 [2790] lines? *A* The three-winding transformer was used so as to more efficiently, more economically utilize or distribute the energy which was received from the C.P. Company.

Q And if you had had generating capacity, adequate generating capacity at your voltages available in Bristol, it would not have been necessary for you to have a transformer or group of transformers to serve the purpose which the present three-winding transformer served? *A* I take it that is a hypothetical case.

Q Yes. *A* Take the hypothetical case of a situation similar, a community the size of Bristol, and if you had adequate generating capacity to serve the territory, well then, you have it. The other problem doesn't come up. You don't have to consider that problem.

Q In that case, would you have to have designed that station to include a synchronous condenser? *A* Could have.

Q Well now, that wasn't my question whether you could have designed it to include a synchronous condenser. My question was would it have been necessary to do so, with adequate generating capacity at the distribution voltages? *A* That would have depended entirely upon the economics of the situation that maintained at that time. For example, [*2791*] we know, we did know at the time of the purchase of the condenser that the industrial loads in Bristol were of a very low power factor. In some cases, low power factor can economically be carried on the customer's premises or taken care of on the customer's premises, the leading current generated on the customer's premises, or produced. In other cases, for commercial practical reasons, that isn't done. Now, a generator at Bristol that was generating a load for the industrial power would have had to have been somewhat of a special design in order to get full capacity out of the generator, or else it would have been necessary to have provided a synchronous condenser, or its equivalent.

Q If your design problem at Bristol had included the providing of a—

* * * * * *

Q —of a source of power at Bristol, by the installation of proper steam generating capacity, would you have provided a synchronous condenser in addition to your properly designed steam generating capacity? [*2792*] *A* Since that was not a problem, it is purely hypothetical, and it could have well worked out to provide the synchronous condenser.

Q Can you name two instances in which that has been done in the design of a source of power? *A* It has been, as I understand

it, advocated by some people. I understand that there is one installation in Derby, where the synchronous condenser is in the powerhouse.

Mr. Branch: In the what?

The Witness: In the generating plant.

[2793] By Mr. Wahrenbrock: *Q* Are you able to name any other instances? *A* I haven't made any survey to determine how many there might be.

Q Do you know of any other instance? *A* I do not.

Q Do I understand you to say that when you design a new generator to supply a load that it is as economical to build a generator and a synchronous condenser as it is to build a properly designed generator? *A* I didn't say that. I said under certain conditions that might be true or could be true.

Q What conditions do you have in mind?

Mr. Branch: Well, I object. I think this is going way beyond the scope of proper cross examination. No such situation obtained, and to ask what might have been done under various conditions which didn't obtain, seems to me to get us nowhere. I think that this might be endless if we go into that.

Trial Examiner: Well, I thought the purpose of this examination was to test statements made by the witness as to the function of the Bristol substation. I believe on that point it is in order.

Mr. Branch: Will my objection and exception be noted?

Trial Examiner: The objection will be overruled and the witness may proceed.

[2794] Mr. Branch: That will apply to any further questions along the line of this hypothetical situation?

Trial Examiner: It is so understood.

By Mr. Wahrenbrock: *Q* You have referred to an instance where you say a synchronous condenser is located close to a generator. Where was that place? *A* It is in Derby, Connecticut.

Q Derby, Connecticut? *A* Yes.

Q Was that synchronous condenser installed at the same time the generator was installed? *A* No, I believe not.

Q Was it installed subsequently? *A* Subsequently.

Q Do you know of any other instance where a synchronous condenser is designed and installed in conjunction with the design and installation of a generator to operate together with the generator, at the same place? *A* That is the only instance I know, at Derby. Such installations have recently been proposed, I understand.

Q Do I understand that as a result of the further examination of the facilities of The Torrington Electric Light Company, which you made during the course of this hearing, you have intended to correct some statements you made when you [2795] testified earlier in this hearing with respect to the physical condition of the facilities there?

* * * * * *

Mr. Branch: I think that is too general and vague.

Trial Examiner: I would suggest that counsel narrow that somewhat.

By Mr. Wahrenbrock: *Q* In your earlier testimony in this hearing, Mr. Hughes, as I recall, you testified that some of the leads to some of the disconnects and possibly other facilities in the Torrington substation had been removed. Is my recollection correct? *A* The first time I testified—that was several days ago—I wasn't clear in my mind about the connections in the immediate vicinity of where the metering transformers were on the 2,300 volt circuit that supplies the small substation of the C. L. & P. Prior to that time I had been through the substation and just glanced very quickly at it, and my first impression was that a jumper had been opened up and I wasn't too sure about it when I testified, but I did find out that that jumper had not been opened up and I testified to that on direct examination this time.

Q And on the basis of the further study that you have [2796] made of the physical facilities themselves, you now wish to correct your earlier testimony and state that there has been no actual removal or change in any of these physical facilities?

Mr. Branch: Just a minute. I don't think that that is a fair statement. I think the witness testified that he was uncertain, in his original direct testimony, about some of those points. He has now explained what has happened, but I don't think that it is fair to indicate that there is a correction. I don't think there is anything that he said now that is at variance with what he said before, except now he is certain about a point which he said he was uncertain of.

Trial Examiner: I was under the impression that the witness had made the statement originally on direct, and then expressed uncertainty on cross-examination. I may be wrong. Is this something that is going to take a few minutes to look up? If so, we will take a five minute recess.

* * * * * *

Mr. Wahrenbrock: Mr. Examiner, in view of respondent's counsel questioning the assumption which I had made in my question, I propose to call the witness's attention to a few specific instances of his prior testimony, and I am perfectly willing, [2797] if he desires to do so, that the witness look at the transcript of his testimony.

By Mr. Wahrenbrock: *Q* I will first direct attention to page 2053 of the transaction, beginning with the 23rd line on the page, where Mr. Hughes said:

> "The connection now is through a lead that runs from the indoor bus to the outdoor structure where the lead has been opened up."

And I will ask you, Mr. Hughes, if that lead had been opened up? *A* Well, can I make a statement that I think will clear this whole business up?

Q I would just like to have that question answered, if I may.

Trial Examiner: The witness may answer.

A By lead, that is a question of terminology. As I just testified, I was originally under the impression that where the connections to the current transformer had been made, it was left

open. However, on further examination, I found that was not so, and I so testify.

By Mr. Wahrenbrock: *Q* And this statement that the lead has been opened up then, you now correct and say that that lead has not been opened up? [2798] *A* It had been opened up in order to make the connection, but it was reclosed. That is the truth of it.

Q And since June 17th it has been closed? *A* That is correct.

Q I now direct your attention to page 2056 of the transcript, beginning with line 19, where the following questions and answers are recorded:

"*Q* Could any such connection be made by closing disconnections or switches?"

I will go back farther in order to get the context, beginning on line 16:

"*Q* Is there any connection between those facilities and the facilities of the Connecticut Power Company?"

And your answer was, "No".

"*Q* Could any such connection be made by closing disconnects or switches?"

And your answer was, "I don't believe so. I think there is a section of cable that is removed."

"*Q* How long a section? *A* Oh, I really don't know, because if I remember right there is a set of leads to the south side, between the inside generating bus and the outside bus of the Torrington Electric Light Company that is disconnected at both ends.

"*Q* How long would it take to reconnect those leads? *A* Well, probably an hour or two."

[2799] And that ends my quotation. And I ask you now if any section of cable as referred to had been removed? *A* I believe originally there had. But apparently, some time during the oper-

ations between the 17th and the present date, a few days ago when I reinspected the plant, the leads had been put back into place.

Q Did you ever see that section of cable, any section of cable actually removed? *A* Just disconnected. Disconnected from the terminal lugs.

Q You have no knowledge of a section of cable actually being removed? *A* No.

Mr. Branch: As you are calling attention to this, Mr. Wahrenbrock, and as the witness has been on the stand several times, may I ask whether it is not true that the testimony that he is giving here was given at the time that you originally called him in this matter, as a part of your own case?

Mr. Wahrenbrock: I am just as anxious to get the matter straight, whether I called him or whether he was called by you. He is, in any event, an official of the respondent company.

Mr. Branch: Well, that is true, but I think it is fair to point out he was giving from his memory, and he indicated that right straight through.

[*2800*] Trial Examiner: Well, I think his answers amply have taken care of him on the question of lack of positive knowledge. He seemed to be quite careful in his earlier testimony and showed he wasn't sure.

By Mr. Wahrenbrock: *Q* In this testimony which I have last quoted, in which you referred to a set of leads to the south side, between the inside generating bus and the outside bus of The Torrington Electric Light Company, do I understand you to say now, on the basis of your further testimony, that that set of leads has not been disconnected at both ends? *A* That is correct.

Q It is correct that they have not been disconnected? *A* They have not.

Q Now, on page 2060 of the transcript, beginning with line 21, I quote as follows:

"*Q* Have the conductors which lead to the substation of

The Connecticut Light and Power Company from the substation of The Torrington Electric Light Company been disconnected from The Torrington Electric Light Company's 2300 volt bus, outdoor bus? *A* I presume you refer to the three heavy copper cables.

"*Q* Yes. *A* That run from the structure of The Torrington Company to the structure of The Connecticut Light and Power Company.

"*Q* Yes. [*2801*] *A* They have been disconnected from the Torrington circuits.

"*Q* When was that done? *A* I think that was June 17th."

And I ask you whether, on the basis of your further examination, you say that those three heavy copper cables had been disconnected from the Torrington circuits? *A* They had not. They had been disconnected, but they were placed back in connection. There were two points in my original testimony where I was not positive as to disconnections. One was on the inside circuit of the plant, and one was at the junction where the cables cross the Naugatuck River, come on to the structure on the east side of the river. I had merely taken a quick look at them, and my first impression was that they had been left open at the transformers, but when I examined them in detail a few days later to reassure myself, I found they were connected at that time.

Q Now, I think that would apply, and in order to make sure I am going to ask you whether that applies, to the answer which appears at the top of page 2068 of the transcript, beginning on the second line:

"The three heavy conductors that go to The Connecticut Light and Power Company are connected to an oil circuit breaker, to three heavy cables that come inside the plant and connect to a [*2802*] bus. In addition to that, there are cables that come into the plant from the outside substation that are disconnected."

I am perfectly willing to continue, although it is not necessary, and add:

> "And if I understand it right, I didn't go into the detail of the thing. I believe they have made some kind of a connection there, but as to whether any power came through the Connecticut—or from the Connecticut Power came through the Torrington bus to The Connecticut Light and Power Company, I don't believe it did. It was my understanding that it didn't."

And you want to say, on the basis of further examination, that there was no such disconnection as you referred to? *A* That merely indicates a disconnect open, doesn't it? Isn't that what it is talking about?

Q Your sentence to which I particularly direct your attention is:

> "In addition to that, there are cables that come into the plant from the outside substation that are disconnected."

A Yes. I had referred to that. That is one of the two places where I was confused.

Q Now, on that same page 2068, beginning at line 18, your answer is, with reference to certain switches:

> "They may have been closed, but it was at the time of a light load, and I didn't explore the matter. They just told me they had put back those jumpers for a short time."

[*2803*] Now, was that statement—

Trial Examiner: Do I understand, before we go any further, do I understand that respondent's counsel raises the question that this is not responsive to direct examination?

Mr. Branch: Yes, sir.

Trial Examiner: It seems to me that we should settle that point, because if it is a question on which it is desired to recall the witness on the part of Commission's counsel, it probably would be better done at some other point, and not interrupt the progress of respondent's case.

Mr. Wahrenbrock: I am willing that he should be called to clear it up. It is true that this line of questioning I am going through now, at least I am willing to assume, I think it is true, that this line of questions occurred in my direct examination of the witness.

[*2804*] Mr. Branch: May I interrupt you a minute? I think I can shorten this. We are anxious to have the true picture presented. My only statement is, in doing this, he is recalling him as his witness. I am perfectly willing he should do that now, with that understanding.

Trial Examiner: It is so understood on the record.

Mr. Wahrenbrock: I think it should not be, if the Examiner please, because on cross-examination it will be recalled, or on direct, by the respondent's counsel, Mr. Hughes did attempt to put in, to prove as an exhibit, a wiring diagram at Torrington, which raised all the same questions again. That being in the nature of cross examination, or further direct examination, I am entitled to go into that on this cross.

Trial Examiner: You mean that was present on direct examination of the witness?

Mr. Wahrenbrock: I am sorry.

Trial Examiner: You mean that was examination of the witness directly, in his present call?

Mr. Wahrenbrock: Yes.

Trial Examiner: Is respondent's counsel agreeable to that fact?

Mr. Branch: Well, I have gotten lost in the maze of this. Mr. Hughes has been on several times and so forth. We want the true facts to appear. The only thing that I don't want is to make it appear that the facts in regard to the testimony [*2805*] were any different than they were, and if it is made quite clear that this was when he was originally called by Mr. Wahrenbrock, having had his mind particularly called to that matter, it is all right.

Trial Examiner: The statements appear to have been made at that stage, although the question of the connection appears also

to have been placed in issue in your direct examination. You may proceed.

By Mr. Wahrenbrock: *Q* I believe this last question to which I referred occurred when I was seeking to ascertain whether there had been any resumption, temporary or otherwise, of supply of power from The Connecticut Power Company to Winsted, and in that connection, you said, as I have quoted you on page 2068:

> "They just told me that had put back those jumpers for a short time."

Now, I would understand from that that some jumpers had been removed. Will you state whether those jumpers had been removed? *A* I can't state that of certain knowledge. What I thought that you were speaking about is that for a while the connection was reestablished, and at the time of that conversation or testimony I was still under the impression that the leads on the inside of the plant had been loosened up and taken off, and from my knowledge of the connection at that time that was the [2806] way they reestablished the connection.

Q By closing those leads or jumpers, as you refer to them? *A* Yes.

Q Now, actually those jumpers were closed, and as your study shows they have been closed since June 17th? *A* When you say June 17th, I can't testify to that. I know they were closed the day I looked at them, last week. They had been removed and put back. Just when they were put back, I don't know. I don't think it is material anyway.

Q And the only times that you have any knowledge of, the jumpers were closed? *A* That is right.

Q I want to direct attention to page 2074 of the transcript beginning with line 6, where you were discussing one of the diagrams and you referred to certain lines in the following language:

> "They are dotted and are shown as owned by others, and if I remember right, when I visited the plant the lugs were removed from the cables on that set of disconnections, to

which the right-hand—where there are two sets of cables, just to the right of where the number 980 appears on it. I believe that was done as a safety measure. I don't know exactly. I didn't look into it in particular, but it does show the diagram, with that exception."

[*2807*] I ask you whether, in view of your further study, you wish to correct the statement that the lugs were removed from the cables? *A* Not from the cables, the terminals. That is the second of the two points that I did endeavor to clear up. There were two points. That is the second of the two points.

Q Do I understand you now that if those lugs were ever removed, they had been reconnected, and your only knowledge of them is that they are there, they are reconnected, and are connected now? *A* That is correct.

Q I am going to direct your attention to transcript page 2079, beginning on line 16, where the question is:

"Are the leads to the disconnects or to the oil circuit-breaker in place and properly connected, or are the leads disconnected? *A* I don't recall. I believe some of them are connected. I recall some of them but not all of them. I could not certify as to all of them."

And I ask you now whether, on the basis of your further examination, you state that all the leads are in place? *A* They are in place.

Q And on the following page, 2080, the first line:

"*Q* So the leads to some one or more of those may be disconnected? [*2808*] *A* That is right."

And with respect to that, your answer is the same? *A* Yes.

Trial Examiner: What do you mean by "the same"? Counsel has not made it clear.

By Mr. Wahrenbrock: *Q* That is, your answer is that the leads are not disconnected? *A* That is right, not disconnected, mean-

ing by "not disconnected" that you are not including disconnects by that.

Q I understand what you mean, but I am not sure that it is straight on the record, Mr. Hughes. Will you make that a little clearer, please? *A* The point being this: As I have said before, all this whole question here is about two points; that I was not clear in my mind as to whether a section of the conductor had been removed. When I examined them in detail, I found that they had not been removed. Apparently some lugs had been taken out of disconnects and replaced, but I want to make this clear, and on my recent examination, certain disconnects were open, but not removed from the circuit. The circuit breakers were open, but were not removed from the circuit.

Q When you say "certain disconnects" were open, by "disconnects" you mean what a layman would refer to as a kind of a switch? [*2809*] *A* A knife-switch operated by a switch stick, as against operated by electrical or mechanical means.

Q And the opening of such a disconnect is a different matter from the removing of bolts or the removing of copper connections and actual physical disruption of the circuit? *A* It is a different mechanical operation, but electrically it accomplishes the same result.

Trial Examiner: But, as I understand, it is simply a switching proposition. The circuit can be instantaneously closed so far as any one point is concerned?

The Witness: No sir; that is not correct.

Mr. Wahrenbrock: The examiner is referring, if I understand him, to the opening of the so-called disconnects.

The Witness: That is the way I understood him.

Trial Examiner: That is what I mean.

The Witness: A disconnect is ordinarily equivalent to a bar of copper or a blade of copper, referring to dimensions generally, probably a foot long, maybe a quarter inch thick, two and a half inches wide. It is hinged at one end and mounted on an insulator and there is a contact provided at the other end,

and in order to open it, since it is alive and ordinarly bare, you use an insulated hook that has a wooden handle, and you insert a bolt or something like that in an eye that is provided for opening the disconnect and manually operate the switch or disconnect switch. [*2810*] There are two kinds of switches involved here. One of them is what is known ordinarily as an oil circuit-breaker or an oil switch and usually they can be operated from the switchboard by a control switch and operated remote from the position, although not always.

Trial Examiner: Well then, the only difference from what I had in mind is that it would take more than an instant to close them. It is more like a comparison of closing a switch and large gate, that you may have to take a few steps to close, but nevertheless it is simply a matter of closing a circuit, and everything is there with which to close it?

The Witness: No, sir; it is a little more than that. In electrical terms it is a little more than that. You can safely close many things through an oil circuit-breaker, many types of circuits. There are relatively few that can be closed by a hand-switch, that is, where there is much power. For example, in Torrington, by closing certain switches you would parallel two systems and that parallelling requires speed, and when you put them together it has to be done very quickly, and if anything happens to be wrong, well then there is some protection, the breaker will automatically take care of the situation, whereas if you try to close the circuit with a disconnecting switch you are more likely, if everything isn't in order, to have it blow up in your face. For that reason it isn't considered safe practice to close circuits [*2811*] above certain capacities with disconnects.

Trial Examiner: I see.

By Mr. Wahrenbrock: *Q* Well, Mr. Hughes, I would like to just add to what you have said by asking you this: Isn't it true at Torrington that there are oil circuit-breakers provided in every instance, so that with the oil circuit breakers open in the proper manner, any set of disconnects that you wish to close can

be quickly closed manually and then whatever phasing or actual closing of the circuits is desired can be carried out by the operating of the oil circuit breakers? *A* It is true that any place that they could be tied together there is an oil circuit-breaker, but there are also disconnecting switches that are open.

Q I wish to refer further to page 2083 of the transcript, beginning with line 20:

> "My impression is that a lead was taken off of that disconnect, so that the connection that runs to the breaker 980 might be connected to it."

I wish to ask you whether that lead, if it was taken off, was replaced? *A* Could I have the diagram as a reference? I don't remember the 980.

Trial Examiner: May the witness see the diagram?

[*2812*] Mr. Wahrenbrock: I will be glad to show my copy of Exhibit No. 80 for Identification, inasmuch as respondent's counsel has asked me to do so? It has some marks on it which I will ask you to disregard.

By Mr. Wahrenbrock: *Q* My question now is whether the lead that you were referring to as one that was taken off of that disconnect, if that was so taken off, has been reconnected, replaced? *A* That is correct.

Q And I refer next to page 2086 of the transcript, beginning at line 10 where your answer reads:

> "It isn't exactly the same way, because there have been some disconnections removed there, if my memory serves me right."

And ask you whether those connections are removed? *A* I don't know where you are referring to now.

* * * * * *

Q I show you the page in the transcript to which I have referred, and direct your attention to the answer which I have read, beginning on line 10. [*2813*] *A* That is the same point, near

the current transformers on the circuit. I was under the impression that there was a lead from the current transformer disconnected. On further examination I found that it was not.

Q Now, at the time my cross-examination was suspended to permit respondent's counsel to put on their expert witness, Lewis, you were referring to your own notes, or to a diary or a journal or something, a little book of your own, to obtain some data with respect to the interruptions in service which have occurred since June 17th. Do you have that? *A* I believe there were two interruptions.

Q When were they? *A* June 29th, a very short one, and June 20th, if I remember right.

Trial Examiner: Both in June?

The Witness: Yes, sir.

* * * * * * [*2814*]

Q Directing your attention to June 19th, was there about 1:30 A. M. on that day a period of time in which Winsted was without electric energy for several minutes? *A* If I remember, there was around a ten-minute interruption, around June 20th, the 19th or 20th. I am pretty sure it was the 20th.

Q What time of the day? *A* I don't know.

Q On that day was the 3125 k. v. a. turbine cut out and another turbine cut in for an hour and a half or so? *A* Are you speaking of June 20th?

Q June 20th. *A* I don't know.

Q Are you able by referring to your notes, or your journal diary, to ascertain that? *A* No.

[*2815*] *Q* Have you any records available to you from which you could— *A* I may be able to. There were two, one of which I had some information on and the other one I didn't.

Trial Examiner: How long will that require?

The Witness: I don't know I have no information on that. I have information on June 29th.

By Mr. Wahrenbrock: *Q* All right. I would like to ask you

now what happened on June 29th? *A* On June 29th, there was some difficulty with the 3150 k. v. a. turbine. I believe that the 1250 k. v. a. turbine was started up, and the lines were parallel with the C. P. system and the two systems ran together until about 11 o'clock, 11 P. M. on the 29th and were separated at that time. There was some emergency due to a bearing heating or something of that nature.

Q When were the two systems paralleled first on that day? *A* I think shortly after noon.

Q Would it have been about 12:24? *A* Thereabouts.

Q Why weren't the two smallest generating units of the Torrington Electric Light Company used that day?

* * * * * * [*2816*]

A I wouldn't know. I don't know.

By Mr. Wahrenbrock: *Q* You have no knowledge as to why they weren't used? *A* No.

* * * * * * [*2818*]

Q Did you make any effort to find out why the Torrington Electric Light Company was unable to carry the Winsted load on the 29th? *A* I made an inquiry and was told that there was bearing difficulty, I believe.

Q On the 3125 k. v. generator? *A* That is correct.

Q Did you seek to find out why they couldn't carry your whole load by utilizing as much of their remaining steam generating capacity as might be necessary? *A* That was a question that was settled right on the spot, and why they didn't do it would only be in a man's mind that was right there at the time. I wouldn't know.

Q You made no effort to find out why they hadn't done that? *A* I inquired, but generally speaking, it was past, and I didn't make any specific inquiry as to why they didn't try to use the smaller units.

Q Were you given any facts which enabled you to decide why

they hadn't? *A* I drew my own conclusion as to why they didn't.

Q What was that conclusion? [*2819*] *A* On the 29th—you are talking about as of the 29th?

Q Yes. *A* I believe that the operator got a little excited, and his thought was to avoid a long interruption to the service. As I get the story, from what little meager information I have been able to pick up, he got a little unduly exercised about the situation, so he tied in with the C. P. system, as a precautionary measure, because it seems like that the difficulty, or what caused them to do it, developed very quickly.

Q Would the utilization of the two smallest steam generating units at Torrington have required a long interruption of service? *A* I don't know that. Under ordinary circumstances, I should say no.

Q How long an interruption would have been necessary on the 29th in order to utilize those two units, in your opinion? *A* I would say—

* * * * * *

The Witness: Under normal conditions, it shouldn't have [*2820*] required any interruption.

* * * * * *

Q Were there any abnormal conditions? *A* I understood a bearing on the turbine got hot.

Q What has that got to do with the amount of time that would be required to cut in the two small units? *A* Quite a lot.

Q Will you explain. *A* Well, if a bearing is noticed to be hot, it is necessary to take the unit off the line very quickly, or considerable damage might be done to the unit. Normally that doesn't happen. Sometimes it happens in emergencies, which happened here. Normally there would have been plenty of time to start up a smaller unit.

Q Then, do I understand that the smaller units are not quickly available in case of an emergency? *A* By quickly available, they are not running, if that is what you mean.

Q How long would it take in case of emergency to get [*2821*] the smaller units on the line carrying loads, carrying their normal rated loads? *A* I have no certain knowledge of that, but I would estimate better than an hour.

Q How much more than an hour? *A* At least an hour. Probably longer, I don't know.

Q Now, you indicated, I believe that the Torrington steam plant on June 29th was operated in parallel with the Connecticut Power Company system from about 12:24 until about 11:00 o'clock in the evening. Is that right? *A* That is correct.

Q Was any effort made during that period of time to get the two smaller steam units on the line carrying the load, instead of utilizing the Connecticut Power Company energy? *A* I don't know.

Q Did I understand you to say you don't know? *A* I don't know.

Q Did you make any effort to find out? *A* No.

Q Were you given any facts which indicated to you why that wasn't done? *A* No.

Q Since June 17th, have there been an unusual number of brief interruptions due to lightning, or other causes on the line?

* * * * * * [*2822*]

The Witness: I wouldn't say an unusual number, no.

By Mr. Wahrenbrock: *Q* Do you know what interruptions there have been? *A* There has been one, I know, due to lightning.

Q Only one? *A* Yes.

Q You have no knowledge of any other interruptions due to lightning or other causes? *A* No.

Q Except the interruptions you have already testified to? *A* One. Two altogether.

Q Do you know whether on July 1st the Winsted switch opened three times? *A* No.

Q Do you know whether on July 8th, between 4:39 and 4:43 A. M., the Winsted switch opened four times? *A* What day?

[*2823*] *Q* July 8th. *A* I didn't know it.

Q On June 29th, when the Torrington plant and the Connecticut Power plant were operated in parallel, what switching operations were necessary in order to accomplish that?

Mr. Branch: I object on the ground that it doesn't appear this witness was there, or that he has personal knowledge.

By Mr. Wahrenbrock: *Q* I will ask if he knows what switching operations were necessary in order that the two be operated in parallel? *A* I don't know the details of all the operation, but I know generally what was done.

Q Well, will you state what was done? *A* I believe the disconnects to the oil circuit breakers were closed, and the oil circuit breakers closed, the oil circuit breaker, that is, that had formerly been connected to the circuit supplying Winsted.

Trial Examiner: Is that a statement of opinion, or is that procedure that your employees are directed to follow?

The Witness: That happens to be—I inquired about that particular day from the man directly in charge of it.

Trial Examiner: You used the expression, "I believe", and that is the reason I asked.

Mr. Branch: May I call your Honor's attention to the [*2824*] fact that he referred to "your employees". My understanding of this matter is, as far as all the testimony goes, that this is not what is done by his employees, but some employees of the Torrington Company.

Trial Examiner: I stand corrected on that point. I didn't mean to assume anything in the question. I meant the employees at the station.

By Mr. Wahrenbrock: *Q* Do you know how long an interruption was occasioned or was necessary at the time the connections

were made to operate the systems in parallel? *A* I don't know of certainty, but I understand that it was a very short time.

Q Do you know whether it was a one-half minute interruption? *A* I understood it was a little longer than that. In the order of four or five minutes, as I understood it. I was given that impression anyway.

Q Would that represent the length of time necessary to operate or to close the necessary disconnections and operate the oil circuit breakers? *A* Not necessarily, no.

Q That is, the disconnects and the oil circuit breakers might be operated in less time than that? *A* They might require a great deal more time.

[*2825*] *Q* Might they be operated in less time than that? *A* It depends on what the setup is at the time. At the time the cut-over was made that you speak of, there were several men present, and that could be arranged to be done rapidly.

Q Do you know whether it was done rapidly? *A* Yes.

Q Do you know how long it took it to be done? *A* Somewhere in the order of four or five minutes, as I understood it.

* * * * * *

Redirect Examination by Mr. SMITH.

Q Mr. Hughes, is the synchronous condenser in Bristol in continual use? *A* No.

Q Can you explain when and why it is used? *A* The Bristol condenser is used during the periods that the industrial load is on, or, I mean by that, when the larger industrial customers are drawing considerable power. It is not on nights, Sundays, holidays, a good many Saturday afternoons, and is ordinarily during the work week started up, in the morning, about the time the factories [*2826*] start, or the loads start to come on, and it is shut down in the evening.

Q What relation does what is done have to the 13.8 k. v. line running out of the Bristol substation? *A* It is always started, and our sole objective in operating the condenser, I say our sole objective, it is the major, if not its entire use, is to maintain the

voltage on the 13,800 volt bus with which the 13.8 feeders are connected.

Q Has that been so at all times? *A* For a great many years.

Q Since 1936? *A* Yes, since 1936.

Q Since 1935? *A* Prior to 1935, I am not too clear about it, because we were—at that time we were operating—

The Reporter: I didn't hear the last part of the answer.

The Witness: Prior to The Connecticut Light and Power Company were in the Exchange.

* * * * * * [*2827*]

Trial Examiner: Will you read the last answer slowly and loudly? It seems to me there is an extra "prior".

(Whereupon the last answer as above recorded, was read by the reporter.)

Trial Examiner: Is something omitted there, Mr. Hughes?

The Witness: I would say there is one "prior" too much. Prior to 1935 we were operating in the Exchange. That gives it the sense I want.

Trial Examiner: Prior to 1935 you were operating in the Exchange?

The Witness: That is correct.

* * * * * *

Q I believe you testified that for some time you were away from the company and returned on a certain time. Would [*2828*] you explain when you were away, and why, and when you returned in this year? *A* I was away six weeks prior to June 30th. I returned to work on Monday, June 30th.

Q Mr. Hughes, you testified in answer to a series of Mr. Wahrenbrock's questions, that certain jumpers were closed since June 17, 1941; that certain jumpers were closed, certain lugs were connected, and certain leads were in place, contrary to some impression you might have had hitherto. Do the facts that those facilities were closed or were connected—do you mean by that that there was any connection between The Connecticut Light

and Power Company line and The Connecticut Power Company's line? *A* I don't meant that, no.

Q Will you explain why you don't mean that? *A* Because at the same time there were disconnects and oil circuit breakers open.

Q When you say at the same time, what do you mean? *A* Over the same period, except for one instance that we cited.

* * * * * * [2831]

Q Would you describe the line from Robertsville to Winsted, and what it does?

* * * * * *

A It is a 4,800 volt distribution circuit which supplies a great many residential customers en route and extends a considerable distance beyond Robertsville.

[2832] By Mr. Smith: *Q* In one direction, and how does it extend in the other direction? *A* It extends north beyond Robertsville and from Robertsville back to the Winsted plant, with branches off of it at several places.

Q And these branches do what? *A* They serve domestic customers mostly.

Q Mr. Hughes, you testified that since 1936 the synchronous condenser at Bristol was used entirely as a matter of voltage control on the 13.8 k. v. line. I want to ask you whether or not that is the fact of its use since August 26th, 1935, the passage of the Federal Power Act? *A* Yes.

* * * * * * [2834]

SAMUEL FERGUSON,

a witness called on behalf of the Respondent, previously sworn, resumed his testimony:

Direct Examination by Mr. BRANCH.

Q Mr. Ferguson, you have previously testified in this case as a witness called by the Federal Power Commission? *A* I have.

Q And I think you testified that you are the president of the Hartford Electric Light Company? *A* I am.

Q And how long have you been president of that company, approximately? *A* I think it is about fifteen years ago that I was elected president. But I have not been president continuously through that time. For an interval of about three years I was Chairman of the Board and not president. I subsequently retained the position of Chairman of the Board, and resumed the duties [*2835*] as president as well, and I have had the two positions for the last three years.

Q During all of that time you have been familiar with the business and affairs of that company? *A* I have.

Q During those fifteen years? *A* Yes, sir.

Q I think you also testified that you are an officer of The Connecticut Power Company? *A* I have held the same offices in The Connecticut Power Company. I am at present president and Chairman of the Board of The Connecticut Power Company.

Q And for about how long have you held those positions? *A* The same period.

Q And you have been familiar with the affairs and business of those two companies all that time? *A* I have.

Q Mr. Ferguson, there is in evidence a contract between The Hartford Electric Light Company and The Connecticut Power Company, Exhibit 36, to which I call your attention; paragraph 4 refers to the undertaking of the Hartford Company to supply the capacity at certain places, which include Middletown and Torrington, and there is also a provision for furnishing additional capacity which may be required from time to time. You see those provisions? [*2836*] *A* I do.

Q And you are familiar with the fact that there has been an agreement with those provisions? *A* That has been about the contract and the agreement.

Q And I also call your attention to another document which is a copy of a contract between The Hartford Electric Light

Company and The Connecticut Power Company. I am informed that that copy that is in evidence is marked Exhibit 37, and that is dated, the first contract, Exhibit 36, was dated June 1, 1936, and this one is dated June 8, 1937. I call your attention to the reference to a contract by which The Connecticut Power Company undertakes to supply The Connecticut Light and Power Company with its requirements of electric power for its Bristol district, and the provision in Article 2 that the seller agrees to take all the buyer's requirements—the seller being—well, that isn't the contract, I think, that I mean. I call your attention to Exhibit 8, a copy of Exhibit 8, which is between—no. I think I was right at first and wrong the second time. Exhibit 37, dated June 8, 1937. In that the Hartford is called the seller, Connecticut Power Company the buyer, and the seller, that is, the Hartford, agrees to supply, and the buyer agrees to take all the buyer's requirements under Article 3 of said agreement of December 16, 1936, between [2837] the buyer and The Connecticut Light and Power Company, relative to the Bristol district. You see that provision? *A* Yes, I do.

Q And you are familiar with the fact that there was such a contract? *A* I am.

* * * * * * [2838]

By Mr. Branch: *Q* I call your attention to Exhibit 36, to the copy of an agreement made as of June 1, 1936. I have already mentioned the provisions. It has to do with supplying the demand at various load centers, including Middletown and Torrington, and I will ask you what the arrangements were between the Hartford Electric Light Company and The Connecticut Power Company, if there were any such arrangements, before the time as of which this contract, Exhibit 36, took effect? *A* For many years prior to 1936 the Hartford Company has continuously recognized this obligation to supply all the power for The Connecticut Light and Power Company at Bristol, and even prior to its being a territory of The Connecticut Light and Power Company. Immediately preceding—strike that out, please.

Q May I interrupt you just a minute, Mr. Ferguson? I am afraid I have confused you a little, because this contract doesn't refer to Bristol, but to Middletown and Torrington. *A* I didn't refer to the contract except as to the date, to fix the time that you referred to, and prior to the date, prior to June 1, 1936, in addition to supplying power at the load centers mentioned, Hartford for many years had recognized [2839] its responsibility for furnishing all the power utilized in the Bristol territory.

Q And was that also true of the loads at Middletown and Torrington? *A* It was, and the other places also.

Q And during the time, so far as you know, were there any formal contracts, specifically covering the matters which are covered in Exhibits 36 and 37? *A* Exhibit 37, executed approximately a year after the contract, Exhibit 36, reduced to writing in the form of a signed contract the practice which had been carried on by The Connecticut Power Company and Hartford, since June 1, the date of the contract in Exhibit 36. Although it had not been reduced to writing, the bills in the period were in accordance with the contract as shown in 37, which were rendered on a verbal understanding, subsequently reduced to writing and appearing in the contract, Exhibit 37.

* * * * * *

Q. Mr. Ferguson, may I start you back a little further. [2840] Exhibit 36 is a contract between Hartford and The Connecticut Power Company, relating to supply of the loads at places, including Middletown and Torrington. Now, before that contract of June 1, 1936 was made, was there any formal contract relating to that same matter between those two same companies, your two companies? *A* No, there was no formal contract. The responsiblity, as I testified, was recognized by Hartford for many years prior to that time.

Q In respect to the loads at Middletown and Torrington? *A* And Bristol.

Q And prior to 1936 did The Hartford Electric Light Com-

pany receive payment for taking care of the demand, as well as an energy charge for the loads in those three places, Torrington, Middletown and Bristol? *A* It did.

Q And had that been the practice as far back as your connection with the Company goes? *A* Yes, sir; there has always been a demand and energy charge, but it has been varied by verbal agreements from time to time over the period of the last fifteen years. I don't mean to say that the charge has been identical in amount, but it has always been billed on the basis of a demand charge and an energy charge.

Q And is it true that The Connecticut Power Company has [*2841*] paid to the Hartford Electric Company for whatever it received in that prior period from the companies which had the plants at Middletown, Torrington and also Bristol? *A* Prior to 1936 Bristol and Torrington were looked on as customers of The Hartford Electric Light Company. The Connecticut Power Company was looked on as the transmitting and billing agent. The Connecticut Power Company billed The Connecticut Light and Power Company for electric service at Bristol, in accordance as they received instructions at Hartford. They received the bill and Hartford billed them for the identical amount. They were paid for their trouble by a transmission service charge.

Q And did the load at Middletown include the load for the East Hampton district of The Connecticut Light and Power Company which was served through Middletown? *A* It included any territory served by Middletown.

* * * * * * [*2842*]

Cross Examination by Mr. WAHRENBROCK.

Q Mr. Ferguson, I show you Exhibit 51 which is an agreement recited to have been made as of the first day of November, 1930, by and between The Connecticut Power Company, referred to in the contract as the Power Company, and The Connecticut Light and Power Company, referred to in the contract as the Electric Company.

* * * * * *

Q Mr. Ferguson, is the contract of which 51 is a copy the contract under which The Connecticut Power Company supplied The Connecticut Light and Power Company with its requirements at Bristol, prior to the contract of which Exhibit 8 is a [*2843*] copy? I show you—*A* There is nothing in the exhibit to show how long this was effective, or whether it covered the full interim between 1930 and 1936. But it was a contract under which power was furnished, at some part at least, of that period and was backed—the delivery was backed by the Hartford Electric Light Company.

By Mr. Wahrenbrock: *Q* I show you Exhibit 8, and ask you whether by referring to the first "Whereas" clause in that contract, you are able now to state whether Exhibit 51 is the contract under which The Connecticut Power Company was supplying the requirements of The Connecticut Light and Power Company up until the execution of the contract which is Exhibit 8? *A* Exhibit 8 is a copy of a contract which recites that it is superseding the contract, a copy which has been given me as bearing the Exhibit No. 51.

Q Do you know whether, as a matter of fact, Exhibit 51 is the contract under which The Connecticut Power Company supplied The Connecticut Light and Power Company at Bristol up to January 1, 1937? *A* It so recites, but I would have to study the contract.

Q Can you do so and make a definite statement? *A* I can make that statement, but I cannot state whether or not subsequent changes were made in the terms by mutual [*2844*] consent. It is the contract that was superseded by Exhibit 8.

Q Except as Exhibit 51 may have been modified, it is the contract under which The Connecticut Power Company delivered energy to The Connecticut Light and Power Company at Bristol up to January 1, 1937, is it? *A* The superseding contract gives the date of December 16, 1936.

Q And I call your attention to Article 2 of Exhibit 8 which you have referred to as the superseding contract, which reads, "Commencing January 1, 1937, the seller agrees to supply and the buyer agrees to take and pay for electric power under the terms and conditions as hereafter set forth". *A* I presume the billing was effective as of January 1st. [*2845*] Then up until the time Exhibit 8 became effective, was Exhibit 51, the contract under which The Connecticut Power Company sold and delivered electric energy to The Connecticut Light and Power Company at Bristol, except as 51 may have been modified by letter or supplemental agreements? *A* It so recites, and I believe that is the fact.

Q You believe it is the fact? *A* Yes.

Q I would like to ask you whether you know of any modification or supplemental agreement that was entered into between the companies modifying or changing any of the terms of the contract which is Exhibit 51? *A* I have brought with me bills, copies of bills, for the month of May, 1934, as illustrated, between The Connecticut Power Company and The Connecticut Light and Power Company, and between The Hartford Electric Light Company and The Connecticut Power Company. Whether these bills are in accordance with this contract, or how they vary, could not be determined without carefully checking up and the bill department rendering and figuring those bills in exact accordance with the contract. The fact is shown by the bills that I have in my hand, what actually occurred. The Connecticut Power Company billed The Connecticut Light and Power Company for power delivered at Bristol with a demand charge, an energy charge and a rental [*2846*] charge. The total amount of $24,058.33. This sum, in turn, was billed by The Hartford Electric Light Company to The Connecticut Power Company, this same amount of $24,058.33, in an item on a bill rendered, which states:

> "Bristol, as figured by you, 2,372,500 kilowatt-hours, $24,058.33."

* * * * * * [2847]

ARTHUR J. HOPPER, JR.,

called as a witness on behalf of the respondent, being duly sworn, testified as follows:

Direct Examination by Mr. BRANCH.

Q Will you please state your name? *A* Arthur J. Hopper, Jr.

Q Will you speak a little louder, Mr. Hopper? What is your home and your business address? *A* My home address is Spring Street, Southington, Connecticut. My business address is 250 Freight Street, Waterbury, Connecticut.

Q By whom are you employed? *A* The Connecticut Light and Power Company.

Q How long have you been employed by that company? *A* Approximately fourteen years.

Q What is your position with the company? *A* I am an assistant engineer.

Q Have you been in that position during all those fourteen years? [2848] *A* Yes.

Q What was your technical education and experience, before you entered the employ of that company? *A* I was graduated from Cornell University with the degree of Electrical Engineer in 1925. I came with the company in 1927. In the two intervening years I was with the Utah Power and Light Company, doing operation and construction work in Idaho and Utah.

Q What are your duties with the Company at the present time? *A* I am a member of the Research Department, with assigned duties comprising load studies of various parts of the system.

Q Have you made certain studies in connection with 321 days which were listed by Mr. Miller on a list entitled "Days having hours when Falls Village Generation was zero and simultaneously Massachusetts energy was received at South Meadow Substation", and another list entitled "Days having hours when Falls

Village Generation was less than the deliveries to Central Hudson Gas and Electric Corporation, and simultaneously, Massachusetts energy was received at South Meadow Substation". I refer to the lists which are in evidence as Exhibits 64 and 65? *A* Yes, I have.

[*2849*] *Q* In your study, did you examine the log sheets of the Connecticut Valley Power Exchange for each of the 321 days which appear on these lists? *A* Yes, I did.

Q Did you use the methods described by Mr. Miller in his testimony in order to ascertain the number of hours in these days in which the conditions mentioned in the title to the list were fulfilled, according to his theories? *A* Yes, I did.

Q Have you a table showing the result of this study? *A* Yes.

Q Is this it? *A* Yes.

Mr. Branch: I am handed a table of one sheet, the first line of which reads, "Memorandum Showing Number of Hours in Exhibits 64 and 65", and I am giving Commission's counsel a copy, and I am giving the Examiner a copy, and I ask that it be marked for identification as the next exhibit number which is 85.

Trial Examiner: It will be marked Exhibit 85 for Identification.

(The Document referred to was marked as Exhibit No. 85 for Identification.)

By Mr. Branch: *Q* What was the period covered by the 321 days which you covered in your search? [*2850*] *A* It covered the years 1937 to 1940 inclusive, and the first five months of 1941.

Q How many hours were there in the entire period of four years and five months? *A* 38,688 hours.

Q During how many of these hours were either of the conditions mentioned in Mr. Miller's lists, which are Exhibits 64 and 65 fulfilled, according to the methods which he said he used?

* * * * * * [*2851*]

Q Will you answer that question? [*2852*] *A* 1,676 hours.

Q And what percentage is that of the total number of hours in the period covered? *A* About 4.3 per cent.

* * * * * *

Q Have you conducted an examination to determine the relationship between the amount of electric energy generated hourly by plants in Connecticut of The Hartford Electric Light Company and The Connecticut Power Company, on the one hand, and the combined loads of The Connecticut Light and Power Company which were connected with the Connecticut Power lines from January 1, 1937, to June 30, 1941; the loads to which I refer are the amounts purchased at the Winsted, Bristol, and at the East Hampton districts, during the period when that district was connected with the Connecticut Power lines.

* * * * * * [*2854*]

The Witness: Yes, I have.

By Mr. Branch: *Q* Will you summarize briefly the result of that investigation?

Mr. Wahrenbrock: The same objection to that.

Trial Examiner: The witness may answer the question. The objection will be noted.

The Witness: There was no hour during this period during which the plants in Connecticut which you have mentioned generated less than such combined loads of The Connecticut Light and Power Company in Bristol, Winsted, and East Hampton.

By Mr. Branch: *Q* Will you describe the data which you examined, and the method which you adopted in coming to the conclusion which you reached? *A* First, I examined the log sheets of the Connecticut Valley Power Exchange. They give the generation hour by hour of the various plants in Connecticut which I have mentioned. They also give the hour load at Bristol.

Q The hour load? *A* The hourly load at Bristol. They do not give the [*2855*] hourly load at Winsted or at East Hampton. The loads at Winsted and East Hampton are, however, compara-

tively light. For the purpose of my studies it was not necessary to determine the hourly loads at Winsted and East Hampton. I satisfied the requirements of the study by taking in each month the largest amount of demand purchased at each of these places, that is, at East Hampton and Winsted, and adding these figures to the hourly load at Bristol. In that way I got larger loads than actually existed most, or perhaps all of the time; any how, I was on the safe side. As against the loads obtained each hour by this method, I compared the amount generated at the South Meadow plant in Hartford. For almost all of the hours during this entire period of four and a half years, I found that the total amount generated at the South Meadow plant alone exceeded the combined loads calculated in the manner which I have described. The only exceptions were a few hours between January 1, 1937, and July 1, 1937. As to those hours I made further study in order to ascertain whether there was generated during those periods enough at one of the other plants which had been mentioned, so that, added to the amount generated at Hartford, it would exceed the combined load for the hour in question. I found that in all such cases the total amount generated in the Connecticut plants did exceed the combined load for the corresponding hour.

* * * * * * [2857]

Q Have you a table showing the monthly peak loads at Winsted, that is, the largest amount of demand during single months, purchased by The Connecticut Light and Power Company for the Winsted district? *A* Yes.

Mr. Branch: I ask that this sheet, the original of which [2858] I hand to the reporter, the next copy of which I give to counsel for the Federal Power Commission; maybe I should have given the second copy to the Examiner, but I think the third is legible, so I give it to the Examiner—be marked Exhibit Number 86 for Identification?

Trial Examiner: The document will be so marked.

(Document referred was marked as Exhibit Number 86 for Identification.)

Mr. Branch: I offer in evidence Exhibit Number 86 for Identification.

Mr. Wahrenbrock: May I have just a moment, please?

Trial Examiner: You may.

Mr. Wahrenbrock: Aside from the continuing objection, I have no other objection to this exhibit.

Trial Examiner: The exhibit will be received in evidence as Number 86.

(Exhibit Number 86 for Identification was marked Exhibit Number 86 in Evidence.)

By Mr. Branch: *Q* Have you a table showing the largest amount of demand during single hours purchased by The Connecticut Light and Power Company from The Connecticut Power Company for the East Hampton district for the years '37, '38 and the first six months of 1939? *A* Yes.

Mr. Branch: I hand a sheet showing that which the witness [2859] has given me, to the reporter, and ask that it be marked No. 87 for Identification. I give the Examiner and Counsel for the Federal Power Commission copies.

Trial Examiner: It will be marked Exhibit No. 87 for Identification.

(Document referred to was marked Exhibit Number 87 for Identification.)

* * * * * *

Q Is Exhibit Number 87 for Identification the document which you prepared in regard to the East Hampton District about which I just asked you? *A* Yes, it is.

Mr. Branch: I offer Exhibit Number 87 for Identification in evidence.

Mr. Wahrenbrock: The same position as on 86.

Trial Examiner: The exhibit will be received as Exhibit Number 87. An exception will be noted for the Commission's counsel.

The same applies to the previous exhibits which were [*2860*] admitted over objection.

(Exhibit Number 87 for Identification was marked as Exhibit Number 87 in Evidence.)

By Mr. Branch: *Q* Do the log sheets of The Connecticut Valley Power Exchange show readings of reactive volt ampere meters? *A* Yes.

Q Do the log sheets indicate the direction of flow of the reactive volt amperes? *A* Yes.

Q Have you examined some of the log sheets of The Connecticut Valley Power Exchange to ascertain whether at any time they indicate that there was a flow of active energy into the C. P. lines there was simultaneously a flow of reactive volt amperes in the opposite direction? *A* Yes, I have.

Q Did you find that there were such times? *A* Yes.

Q Will you specify a few of the hours when that occurred?

* * * * * * [*2863*]

Q The question is whether you will specify some of the hours when that occurred, Mr. Hopper? *A* For example, on May 29th, 1940, during each of the hours from 7:00 P.M. until 11:00 P.M., inclusive the watt-hour meters indicated a flow into the C.P. Lines. During all these hours the meter registering reactive volt amperes indicated a flow in the opposite direction.

Q Is it true that during that four hour-period the watt-hour meter indicated a flow only to the C.P. lines and the meters registering reactive volt amperes indicated a flow only in the opposite direction? *A* That is correct.

[*2864*] *Q* I find I omitted some questions, but I can put them in now. Referring to any memorandum you have, and if necessary, to Exhibits 86 and 87, what was the peak load of The Connecticut Light and Power Company at Bristol since January 1, 1937? *A* The maximum peak was 16,560 kilowatts.

Q What was the largest amount of demand at any time since January 1, 1937 purchased by The Connecticut Light and Power

Company from The Connecticut Power Company for the East Hampton district? *A* 1,324.8 kilowatts.

Q What was the largest amount of demand purchased at any time since January 1, 1937 by The Connecticut Light and Power Company from The Torrington Electric Light Company for the Winsted district? *A* 1,952 kilowatts.

Q What is the total amount of these three peaks which you have given for Bristol, Winsted, and East Hampton? *A* 19,836.8 kilowatts.

* * * * * * [*2865*]

By Mr. Wahrenbrock: *Q* Will you describe what meter readings at the South Meadow substation you took in order to make the statement you made about reactive power? *A* On the Connecticut Valley Power Exchange log sheet, the column "To C.P. lines", gives the integrated hourly flow to Connecticut Power lines at that point. And the column just to the right of that a little bit, "C.P.R. k.v.a.", gives the indicated reading at the hour at that point also, that is, to the C.P. lines at South Meadow substation.

Q And were the latter the only readings you took into account? *A* Yes.

Q Now, when you say at that point, what point do you mean? *A* At the location of the metering current and potential transformers on the two 66 k.v. lines, at the terminal facilities at South Meadow substation.

Q Have you made any study of the facilities at the South Meadow substation to determine where those meters are connected to the circuits? *A* No, only in a general way, I am familiar with that point.

Q What basis of knowledge have you for knowing what those readings mean? [*2866*] *A* I inquired as to the meaning of those readings through Mr. Mayott and his assistants at the Connecticut Valley Power Exchange office.

Q How many meters are there from which the readings you

considered are taken? *A* Are you referring to the watt-meters or the R.K.V.A. readings?

Q The R.K.V.A. readings. *A* I merely understood that there is an indicating meter that indicates—

Q You understand there is one meter? *A* An indicating meter.

Q An indicating meter? *A* That is correct.

Q You don't know of your own knowledge whether there is more than one meter? *A* I don't know.

Q Do you know whether that meter is connected to the C.P. 1 line? *A*. I do not know.

Q Do you know whether it is connected to the C.P. 2 line? *A* I do not know. I merely understand from conversation with members of the Connecticut Valley Power Exchange organization—

* * * * * * [2867]

The Witness: I merely understood from conversation with members of the Connecticut Valley Power Exchange that the R.K.V.A. meter on the C.P. lines indicates the R.K.V.A., or R. kilowatt-volt-amperes that are flowing either in or out to the C.P. lines at that point.

Q Have you ever actually seen that meter? *A* No, I have not.

Q Or the connections to the lines? *A* No, I have not.

Mr. Wahrenbrock: Mr. Examiner, I move that the testimony that has been given by this witness on that point be stricken, on the basis of the cross-examination thus far.

Mr. Branch: I think that Mr. Miller has testified on the same kind of a basis. Evidently counsel for the Federal Power Commission felt it was all right for him to use these log sheets and meter readings, and I don't see why our witness cannot do the same.

Trial Examiner: I think the difference is there was some testimony that Mr. Miller knew where the meters were. The witness doesn't appear to know where the meters were. He is testifying entirely on information received. However, I will let the testimony stand. It may be supplemented, to make it understandable.

[2868] By Mr. Wahrenbrock: *Q* I understand you to say that—

Trial Examiner: An exception will be noted for Commission counsel on the motion to strike.

By Mr. Wahrenbrock: *Q* (Continuing) —that you have been told by somebody that those meters register instantaneous values? *A* The r. k. v. a. meter, I understand is the indicating-type meter.

Q Do you know whether such meters register instantaneous values or register the average of instantaneous values over a few consecutive cycles? *A* They average the instantaneous—they give the average of the instantaneous value over the cycle. It is not an instantaneous figure, it is just the average effective amperes.

Q Now, what do you mean by "effective"? *A* The effective current in an alternating current.

Q Are you talking about reactive current? *A* Yes, it is either reactive or active, the current part of it is fluctuating in cycles, 60 cycles per second, and the value of an ammeter or an r. k. v. a. meter at this point reads as the effective value of amperes, which is the root mean square of the sine curve.

* * * * * * [2869]

By Mr. Wahrenbrock: *Q* I understand that in the statement you make about the readings, it is based on your understanding of such meters generally, and not upon your personal knowledge of the particular meters here involved? *A* That is correct.

Q On your statement with respect to effective current, do I understand then that what this meter registers or what meters of this kind register is the average over a half-cycle of the current under consideration? *A* Yes, that is correct.

Q Then it is not an instantaneous value? *A* No.

Q Well now, I don't understand why you now say it is not an instantaneous value when I previously understood you to say it was an instantaneous value.

Trial Examiner: I didn't understand the witness to say that. I suggest that you check closely on his answers on that.

Mr. Wahrenbrock: It is my recollection, but I will leave it up to the witness to explain.

The Witness: Perhaps I can qualify it. When I spoke of indicating meters as giving an instantaneous reading, I was speak- [*2870*] ing in terms of longer than a cycle or so. When I was describing what the current device of either an ammeter or an r.k.v.a. meter read, we came down to smaller divisions of time and the effective ampere readings is what the meter reads but the current actually does fluctuate 120 times in one second. It goes through a positive maximum and a negative maximum; it completes a cycle and there are sixty of those cycles in a second.

Q Then the r.k.v.a. meters that you speak of are registering reactive current over several cycles in the course of which the reactive current reverses its direction several times? *A* That is correct.

Q Well now, if the reactive current reverses its direction several times, how can you say that the meter indicates direction? *A* Both the r.k.v.a. meter and a wattmeter indicate or read the current or watts, whichever may be the case. The wattmeter is reading the direct or the current in a certain phase angle. The r.k.v.a. meter reads the current at 90 degrees to that. So that the instantaneous values pass through zero on both meters but they are not in phase with one another, while the r.k.v.a. meter may be positive, in the direction to the neutral axis, the r. k. v. a. meter will be 90 degrees out of phase with that, or else negative.

Mr. Wahrenbrock: I don't have the benefit of an engineering [*2871*] education in examining you and I haven't had time to get the benefit of technical advice, so I have just got to ask you questions to try to understand this from what you say. I don't understand from the answer you have given, how a meter which is an r.k.v.a. meter which registers an average over several cycles, in the course of which the reactive current reverses its flow several times, can indicate direction of flow of a current which is alternatingly flowing in two directions. How can that current have a direction of flow on the average, or over a period of time? *A* The alternating current flowing along a line can be represented by two vectors.

Q When you get talking of vectors, I don't understand very well, and I am going to ask you to draw a little diagram so that maybe I can follow you.

* * * * * * [*2872*]

A (Continuing) Alternating current in amperes may be represented by two vectors. The current in phase and the current 90 degrees to it may represent the current vector. We often speak of the vector as the power vector, as the direct power that can be obained by any given circuit. The portion of that vector, the 90-degree portion, is the wattless power or component.

[*2873*] By Mr. Wahrenbrock: *Q* Does that complete your answer? *A* No. May I have your question again, please?

* * * * * *

Q Now, that is the pending question. Now, I would like you to read the answer to this point, if I may.

(Whereupon the last answer as above recorded, was read by the reporter.)

By Mr. Wahrenbrock: *Q* Now, have you completed your answer? *A* No, I haven't.

Q Will you do so? *A* The alternating current in a circuit can be represented instantaneously by vectors, a vector in phase and a vector at 90 degrees to it. The vector I have called in phase represents the power vector, and the vector at right angles to it is the wattless vector. These are instantaneous values, as I have mentioned before. Now, the effective current of each one is the root mean square of the sine curve of each current, so that the watt meter which is the effective amperes of the vector in phase, is the average value effective amperes of that vector; and the effective amperes of the wattless current [*2874*] is the vector which is 90 degrees to that, and would represent the current 90 degrees out of phase with the power current. So that, the watt meter reads the vector, so-called in phase, and the R.K.V.A. meter reads the amount in the amperes, or the effective amperes 90 degrees in phase to that.

Q Then, am I to understand that you say that there are two currents flowing in an alternating current conductor, one out of phase with the other, and the wattmeter measures one current and the R.K.V.A. meter measures the other current? *A* No. I said that the actual current flowing in a circuit may be resolved into two vectors, one a direct current, so to speak, and one the wattless current. One, the power current, and one the wattless current. They are not two currents. There is only one current, but it may be represented by two vectors, 90 degrees to each other.

Q And one of these vectors is the reactive power that you have been talking about? *A* That is correct.

Q And that reactive power isn't a current? *A* Yes, it is. Power is current times the effective voltage.

Q But I thought you said that this reactive power was a vector and not a current? *A* It is a current vector.

Q It is one of two vectors of a single current? [*2875*] *A* That is correct.

Q Now, you used the term "wattless power". What do you mean by "wattless power"? *A* It is a common phrase used by engineers to express that component of the total current which is out of phase by 90 degrees with the power current.

Q Well, does it mean power at all? How can it be power if it is wattless? *A* Well, that is merely an expression. The expression "wattless" is merely an expression. The term, I believe, at the present time is "reactive volt amperes".

Q You have made a statement as to your views as to opposite flows of active and reactive energy. Does the reactive energy have the power to do work in an electric appliance? *A*. No, it does not.

Q Well, then, this reactive thing isn't energy at all, is it? *A* It is not classified as energy, but it is always in existence in an A.C. current.

Q Well, here is what I mean to get at. I believe all of our experts on both sides are in agreement that energy is the ability to do work? *A* That is right.

Q I may phrase it roughly, but that is my lay concept [*2876*] of it. Now, if you have something here that can't do work, it isn't energy, is it? *A* You can express it that way.

Q Well, then, this R.K.V.A. measurement is a measurement of something that isn't energy, is that right? *A* Yes, that is right.

Q Well, then, now you spoke of things flowing in opposite directions. I say things because I am not sure what they are. I want to find out. I take it then that this reactive, whatever it is, isn't energy, so it isn't an energy flowing in an opposite direction from the active energy, is it? *A* It is not an energy flowing in the opposite direction, no.

* * * * * * [*2877*]

Q Now, I want to come back to what I asked you before, and which I heard you make a response in response to, but [*2878*] which didn't clear up the question that I had in mind, and that is this question of how, if these R.K.V.A. meters are measuring an average of something over several cycles, or a few consecutive cycles, they can be measuring something that is going in one direction, when the very statement of the fact that there are cycles indicates that that something is going in both directions, and if they are measuring the average, how do you say that they measure something that is going in a direction, a single direction? *A* In the current, alternating current, that is, on an A.C. circuit, it may be represented by a certain value in amperes. An ammeter put in that same circuit will read, say, or approximate, ten amperes. If the power factor of that particular circuit is eight tenths, then a watt meter would read not ten amperes times voltage, but eight amperes, and the energy current would be eight amperes. In that same hypothetical A.C. current, the r.k.v.a. meter would be reading approximately six-tenths, or six amperes, so that the watt meter would be measuring the effective current of only eight amperes, and the r.k.v.a. meter would be reading the effective current of six amperes, whereas the actual current measured by the ammeter will be ten amps.

Q You have been speaking of the watt meter, have you? *A* I was speaking of the watt meter and ammeter together.

[*2879*] *Q* Well, watt meters measure energy? *A* Yes, they measure energy, but they measure the component in phase, so to speak, with the voltage. That is, if a power factor of a circuit is eighth-tenths, the watt meter current element does not read ten amperes flowing in the actual circuit, flowing in the circuit, but it measures eight amperes, that portion that is in phase with the energy component.

Q Well, if I understand your statement then, the r.k.v.a. meter is measuring something, a different vector, and a different part of the phase, but how does that indicate a different direction of flow, of whatever it is that it is measuring? *A* The direction of flow has been indicated to me by the plus or minus signs on the k.v. log sheets. A current has to flow one direction or another, and the readings on the sheets of the r.k.v.a. meter are preceded by a plus or a minus sign.

Q Are you talking about currents or are you talking about energy? *A* I am talking about the current vector of the r.k.v.a. meter. The r.k.v.a. meter reads the product of the current and the voltage.

* * * * * * [*2880*]

SAMUEL FERGUSON,

previously sworn, resumed his testimony:

Cross Examination (*Resumed*) *by* Mr. WAHRENBROCK.

Q At the time we suspended the cross-examination, Mr. Ferguson, you had just referred to a bill or a copy of a bill that you had in your hands showing The Connecticut Power Company's method of billing The Connecticut Light and Power Company for Bristol deliveries, and The Hartford Electric Light Company's method of billing The Connecticut Power Company, with an indication "at Bristol" in connection with that billing. I wish to ask you if you referred to those two bills for the purpose of showing that the Exhibit 51, had been modified as of the date of those bill-

ings, and if you wish to suspend your answer until I can show you Exhibit 51, you may do so. I place Exhibits 51 and 8 before you. *A* That was not my object of referring to the bills. Exhibit 51 is a contract of a number of pages covering the terms and conditions, and I said that I did not know whether that had been modified or not. But in any case here was the bill covering a month in the period covered by that contract. I could not at this time check the bill against the terms of the contract, but that could be done by the billing department later, if it [*2881*] was desired.

* * * * * * [*2883*]

Q I ask you whether you now have any recollection of whether Exhibit 51 had been modified at the time Exhibit 8 took effect? *A* I think that it had because Exhibit 51 calls for an agreed [*2884*] 10,000 kilowatts. The balance of the load in Bristol, as it is recited, is to be furnished by The Connecticut Light and Power Company itself, from its own facilities. Now, the contract covered by Exhibit Number 8 assumes the total obligation at Bristol, which was necessary, inasmuch as prior to the date of that contract the lines of The Connecticut Light and Power company had been disconnected from those of The Connecticut Power Company, so that the entire contractual supply had to be furnished by The Connecticut Power Company, and that contractual supply that is covered in Exhibit 8 was backed, at first verbally, and later a reduction to writing, by The Hartford Electric Light Company and The Connecticut Power Company. The responsibility for the delivery of the power rested entirely on The Hartford Electric Light Company.

Q Yes. Now, do I understand then that prior to about June 1,—let me fix that date first. Was that approximately the date of the disconnection of the New Britain interconnection? *A* I don't think so. I think, if my recollection of dates is right, it was disconnected in August of 1935. It was prior to the Wheeler-Rayburn Act becoming the law of the land.

Q I believe, Mr. Ferguson, that the testimony in this case has

indicated that there was a disconnection of the New Britain interconnection at the time of the adoption of the [2885] Public Utility Act of 1935, but that with the restoration of The Connecticut Power Company's interstate connections, The Connecticut Light and Power Company shortly resumed its New Britain interconnection and that the New Britain interconnection was subsequently discontinued about June of 1936 and it was that second date that I was trying to fix, when the New Britain interconnection was last— *A* After the disconnection.

* * * * * * [2888]

Q Mr. Ferguson, have you refreshed your recollection so that you are able to state whether there was an interconnection of The Connecticut Light and Power Company and The Connecticut Power Company at New Britain, from the time of the enactment of the Public Utility Act of 1935 until about the first of June, 1936? *A* Yes. I wish to correct my former answer wherein I stated that the New Britain connection was not restored except on an emergency. I want to correct that to state that it was not restored except on emergency during any time that the Agawam connection was in operation, except for emergency periods. But during the periods that the Agawam lines were open, this interconnection was in existence, after August, 1935, until The Connecticut Light and Power Company were notified that the Agawam connection was to be restored, at which time the connection was once more opened.

Q And are you able to fix that date of the last opening of the New Britain interconnection? *A* The latter part of May, 1936.

Q Now, between August, 1935 and the latter part of May, 1936, was The Connecticut Power Company obligation to supply electric energy to The Connecticut Light and Power Company at Bristol backed up by any obligation on the part of The [2889] Connecticut Light and Power Company to supply electric energy to The Connecticut Power Company at New Britain?

* * * * * *

The Witness: Around that time there was a question of the continuance of the supply from Hartford as against Connecticut Light and Power Company building a line to Bristol, and operating it from their own facilities. The question of cost was an issue, and we decided to temporarily, inasmuch as both companies had surplus facilities, decided to split the load between Hartford and the facilities of The Connecticut Light and Power Company. This contract, Exhibit 51, recites that The Connecticut Power Company with the backing of Hartford would take the Bristol load up to 10,000. The Connecticut Light and Power Company would supply themselves the balance. It was not a case of backing the Connecticut Power Company. It was a case of furnishing power for their own territory, in the extent, as I recall, of about 3,000 furnished by their own facilities, and 10,000 from Hartford.

[2890] By Mr. Wahrenbrock: *Q* Then, do I understand that about the end of May, 1936, when The Connecticut Light and Power Company severed its interconnection at New Britain with The Connecticut Power Company's lines, no contractual arrangement was made for the supplying to Bristol of energy in lieu of that which The Connecticut Light and Power Company itself had previously supplied from New Britain? *A* You mean was there any duly executed contract, or do you mean understanding?

Q I mean to know what the facts are. *A* Why, of course, Hartford assumed that, as soon as they cut it, and told them they could carry it for them.

Q Was there any conversation on the point? *A* I presume so. I don't recall.

Q You have no recollection of any conversation? *A* I have no recollection of a conversation about it, but it was perfectly obvious they were going to cut it, and we assumed it. It was only a question of price. It was a question of not charging them for that 3,000 kilowatts, and the reason for not charging for that 3,000 kilowatts was that they had plenty of capacity back of

Bristol. They didn't need to buy the whole of the 13 being used in Bristol. As soon as the lines were cut, we had to take it all up. There was no question.

Q Then, the essential fact is that The Connecticut [*2891*] Power Company did deliver the energy, whether there was any agreement to do so, or any conversation about it, or not? *A* The Hartford supplied the energy to The Connecticut Power Company because at that time the arrangement with The Connecticut Power Company was that all its power was supplied by Hartford, and Hartford assumed the total responsibility and treated the Bristol and Torrington contract as Hartford contracts, for which The Connecticut Power Company was paid a transmission charge for delivering Hartford power to Bristol.

Q Then, instead of saying Connecticut Power, I will substitute The Hartford Electric Light Company, and ask you whether from the time of the discontinuance of the New Britain interconnection, the latter part of May, 1936, The Hartford Electric Light Company in addition to furnishing the power and the energy which it was obligated to furnish under the written contract, which is Exhibit 51, supplied— *A* That isn't the contract between Hartford, is it?

Q Exhibit 51 is between the Connecticut Power Company and the Connecticut Light and Power Company. *A* You said Hartford.

Q Now, let me understand what the facts were. Under Exhibit 51, The Connecticut Power Company was obligated to furnish up to 10,000 kilowatts. *A* Yes.

Q To the Connecticut Light and Power Company, and it [*2892*] did furnish energy in accordance with the terms of the contract, according to what you have previously said. Is that correct? *A* At the time you are speaking of, The Connecticut Power Company was under an obligation to deliver all of its own power to Hartford, and Hartford was under an obligation to The Connecticut Power Company to supply the entire requirements of its customers. The Hartford paid The Connecticut Power Company

the sum of $636,000 for the use of all the kilowatt hours of The Connecticut Power Company and the use of its facilities in the transmitting of Hartford power to points in the State.

Q Then, do I understand that while under Exhibit 51, The Connecticut Power Company was obligated to supply the Connecticut Light and Power Company's requirements at Bristol up to 10,000 kilowatts, that its obligations was discharged for it by Hartford? *A* Yes.

Q And after— *A* That obligation was assumed by Hartford. That might be a more correct way of stating that.

Q And after the end of May, 1936, Hartford supplied all of the requirements for Bristol, without a written contract, or without any conversation, obligating it to supply more than was referred to in Exhibit 51? *A* Well, it is very hard to deny a conversation. You [*2893*] see that I was the principal officer of both companies, and I had an obligation to myself, as president of The Connecticut Power Company, that I, as president of The Hartford Electric Light Company, should take care of their requirements.

Q Yes, but now—

Trial Examiner: A subjective contract.

By Mr. Wahrenbrock: *Q* I am not speaking of a contract between Hartford and Connecticut Power. I am speaking of a written contract or a conversation, or something verbal, a verbal agreement between either Hartford or the Connecticut Power on the one hand, and The Connecticut Light and Power Company on the other hand, with respect to the Bristol requirements above the 10,000 referred to in Exhibit No. 51. *A* There must have been a conversation. I have only denied recalling the conversation. But they couldn't have just disconnected the lines and hoped that the Lord would provide power.

Q Well, either the Lord or The Hartford Electric Light Company, or The Connecticut Power Company did provide the energy? *A* The Hartford Electric Light Company did provide energy, and

has been responsible for the energy from Bristol for years and years.

Q And at the present time, you are not able to recall [2894] any conversation or verbal agreement for the furnishing of that, aside from the mere fact that it was billed and paid for? *A* I can't recall any conversation.

* * * * * * [2897]

ARTHUR J. HOPPER, JR.,

a witness, previously sworn, resumed his testimony:

Cross Examination (Continued) by Mr. WAHRENBROCK.

Mr. Wahrenbrock: Shall I proceed?

Trial Examiner: You may proceed.

Q Mr. Hopper, as I understood what you were saying before the interruption of the cross-examination, r.k.v.a. meters are designed to register a vector, are they, that vector being 90 degrees out of phase with the active power vector? *A* Yes.

Q By 90 degrees do you mean a quarter of one complete circle? *A* Yes.

Q Are those two vectors, or are those two vector components active and reactive, are they vector components of the same flow of power? *A* Not exactly. The flow of power, the component, the vector, that results in work being done is the active vector, and the reactive, in conjunction with the two gives the algebraic [2898] sum of the two, the reactive and the active vector gives you the total k.v.a. which is, in the case of a circuit, the current measured in amperes times voltage of the circuit, will give us the k.v.a. of that circuit.

Q Now, as I understood your earlier testimony, these two vector components are not actual separate currents, is that right? *A* No, they are not actual separate currents.

Mr. Branch: I didn't hear the answer.

The Witness: No, they are not actual separate currents.

By Mr. Wahrenbrock: *Q* They are vector components of the same current, are they? *A* That is correct.

* * * * * *

Q What is a vector, as you use it? *A* A vector, as I use it, is merely an expression of direction of flow, in this case, current.

Q Did that complete your answer? *A* Yes, I believe so.

* * * * * * [2899]

Q Well, can you have a voltage vector? *A* Oh, yes.

Q Well, what is a voltage vector? *A* A voltage vector is a line indicating direction of flow which is usually marked with a different symbol other than the current vector. A current vector and a voltage vector are one and the same. They look the same, except you may put a little different designation on the current vector, to separate the two of them, to distinguish the two of them.

Q How can you speak of a flow of voltage? *A* Well, voltage and current in any given electrical circuit, A. C. circuit, can be represented by a voltage vector and that in turn must be represented additionally by a current vector, and the relationship of those two vectors determines the power factor of the circuit.

Q Well now, you can't say, can you, that a vector represents the direction of the flow of voltage? *A* No, not exactly.

Q Well, can you say that a vector represents the direction of flow of current, then? *A* Yes. I think so.

Q Well now, when you have these two component vectors, is the actual flow of energy the resultant of the two component [2900] vectors? *A* The actual flow of energy is not the resultant, no.

Q Well, is it accurate to say that the flow of current is the resultant of the two component vectors? *A* Yes, I would say so diagrammatically.

* * * * * *

Q Well, that is what the actual current is, isn't it? *A* That is what the actual current is.

Q And that is the only actual current there is? *A* That is correct.

Q Is the reactive power another way of designating the exciting current, or the magnetizing current? *A* Yes, it can be expressed that way.

Q Well, what happens to this magnetizing current, the magnetizing energy? *A* Pardon me?

Q What happens to the magnetizing energy that is supplied to the consumers' devices? *A* Did you say magnetizing energy?

Q Yes. Am I incorrect in my wording of this question? *A* I thought we called it magnetizing current, or current times voltage. It is not energy exactly.

[*2901*] *Q* Now, we have had reference to magnetizing energy? *A* Yes.

Q How do you relate that to magnetizing current? *A* It is current times voltage in the circuit will give us magnetizing energy.

Q What happens to the magnetizing energy when it is supplied to consumers' devices?

* * * * * * [*2904*]

Trial Examiner: The witness may answer. Note an exception to counsel for the respondent.

The Witness: The magnetizing energy is used up in numerous devices you find on consumers' premises. such as small transformers, or large transformers, motors—

By Mr. Wahrenbrock: *Q* And when you say used up, do you mean it is stored in them for a portion of a cycle and returned to the circuit? *A* That is as I understand it, yes.

Q And this same magnetizing current is stored in the transformer and returned to the circuit? *A* Yes, that is right.

Q And it is essentially a process of storing and circulating the energy which makes up that magnetizing energy? *A* Yes, I believe that is correct.

* * * * * * [*2906*]

Q The magnetizing energy then is an energy which is stored in the transformer and returned to the circuit and stored in the con-

sumers' appliances and returned to the circuit each cycle, is it? *A* Yes, I believe that is true.

Q I have been speaking in these last few questions of magnetizing energy.

Trial Examiner: Well now, are you going to relate this to this reactive current?

Mr. Wahrenbrock: I want to ask if the magnetizing energy is r.k.v.a.

The Witness: As I understand it, the sum of all your appliance magnetizing energy as a group all coming through to the main substation and thereupon appear as reactive current, yes.

[*2907*] *Q* As reactive current? *A* Reactive volt amperes.

* * * * * *

CLARENCE W. MAYOTT,

a witness, previously sworn, is called on behalf of the respondent and testified as follows:

Direct Examination by Mr. BRANCH.

Q What is your name? *A* Clarence W. Mayott.

Q Have you testified before in this case as a witness for the Federal Power Commission? *A* I have.

Q As Manager of The Connecticut Valley Power Exchange have you been familiar with the connections of the various generators in the generating plants of the Hartford Electric [*2908*] Light Company and The Connecticut Power Company in Connecticut since January 1, 1937? *A* Yes.

Q I didn't get the answer. *A* Yes.

Q What is the capacity of the South Meadow Steam plant? *A* At the present time it is 130,000 kilowatts.

Q Has that been the same ever since August 26th, 1935? *A* Yes, except that a 40,000 kilowatt unit was added and put in operation in September, 1938. Before that time the capacity was 90 kilowatts.

Q What is the capacity of the Hartford Electric Light Com-

pany's plant at Dutch Point? *A* 34,000 kilowatts; prior to the first part of 1937 it was 36,000 kilowatts.

Q The first part of '37? *A* 1937, yes, sir.

Q Has the Dutch point plant since August 26th, 1930 been connected in such a manner that it can be called upon for reserve capacity? *A* That is, for all intents and purposes the Dutch Point plant and the South Meadow plants could be considered as one plant.

Q Did you say the Dutch Point plant, and the South Meadows plants? [*2909*] *A* The South Meadow plant.

Q Has The Hartford Electric Light Company any other plant? *A* The Tariffville Hydro Plant with an installed capacity of 1,500 kilowatts. This capacity has been the same since August 26th, 1935.

Q The plants you have mentioned were the only plants which The Hartford Electric Light Company owns? *A* Yes, they are.

Q Only generating plants I mean, of course. Are the plants of The Hartford Electric Light Company, to which you have referred, all connected with C.P. lines 1 and 2? *A* Yes.

Q What plants of The Connecticut Power Company are connected with C.P. lines 1 and 2? *A* The Falls—

* * * * * * [*2910*]

Mr. Branch: Well, are you familiar with the plants, and their capacities?

The Witness: I am. My interpretation of your question was "the plants".

By Mr. Branch: *Q* What plants of The Connecticut Power Company are connected with lines 1 and 2? *A* The Falls Village hydro plant with an installed capacity of 9,000 kilowatts and a capability of 11,000 kilowatts and the Unionville hydro plant with an installed capacity of 1,600 kilowatts. These figures are the same for all times since August 26th, 1935.

Q Were all generating units, when generating, in these plants of the Hartford Electric Light Company and The Connecticut

Power Company connected to C.P. lines 1 and 2 at all times between January 1, 1937 and July 1, 1937? *A* Yes, except for short periods when line disturbances might have separated the system.

Q Was any interruption as to which you have referred of any considerable duration during that period? *A* No. The maximum is of a few minutes duration.

[*2911*] *Q* Have such interruptions been frequent or infrequent? *A* Very infrequent.

Q Have all generating units of The Hartford Electric Light Company at South Meadow and Dutch point when generating, been connected at all times to the C.P. lines 1 and 2 since January 1, 1937? *A* Yes, except for short and infrequent periods of interruptions due to line disturbances.

Q What was the maximum of those disturbances or interruptions? *A* Just a few minutes.

Q Mr. Mayott, will you please state the annual peak loads on The Hartford Electric Light Company and The Connecticut Power Company's interconnected system for the years 1937, 1938, 1939 and 1940 and the date in each year in which those peaks occur?

Mr. Wahrenbrock: I object to the answering of that question, Mr. Examiner. It hasn't any relevance to any issue in this proceeding. I have kept still without objecting to the line of testimony up to this point, because I realized that it was consistent with a point of view which the respondent is urging, but which, in my opinion, has no relevancy. Here I don't even understand this is relevant to any issue of proof which they have been thus far presenting in this case.

Trial Examiner: Will you state the purpose for which you [*2912*] desire to—

Mr. Branch: I think it is important to show, particularly in view of Mr. Ferguson's testimony, as to the obligation of The Hartford Electric Light Company with The Connecticut Power Company's assistance, to supply these loads of our plants, to show the capacity of those loads, and also to show that they are able to take care not only of our loads, but also of all other loads to which

they are connected, the point being that these plants alone are sufficient to take care of all of these loads at all times. That, I think, is an important point in the picture, and it will only take a minute to develop it. I have only two questions.

Trial Examiner: The size of the plant may be relevant. The question of materiality may be determined later by the Examiner.

Mr. Wahrenbrock: May I make just this point, Mr. Examiner, in that connection? As long as there is interstate commerce and interstate transmission, it doesn't make any difference whether if I am a local dealer I have got enough customers and I have got enough supplies so that I could supply them locally if, as a matter of fact, I do supply them from out of the State. What I do locally is immaterial.

Trial Examiner: The evidence will be admitted. The objection is overruled. Note an exception for Commission counsel. *A* For 1937, the date was November 22nd and the peak was [*2913*] 100,000 kilowatts. For 1938 the date was December 28th and the peak was 106,000 kilowatts. For 1939 the date was December 20th and the peak was 118,700 kilowatts. For 1940 the date was December 23rd, and the peak was 134,000 kilowatts.

By Mr. Branch: *Q* Will you also give the capability of the Hartford Electric Light Company-Connecticut Power Company's generating plants and their interconnected systems in kilowatt hours on those same dates? *A* In 1937, the capability was 140,500 kilowatts. In 1938 the capability was 180,500 kilowatts. In 1939 the capability was 180,500 kilowatts. In 1940 the capability was 180,500 kilowatts.

Q What if anything does a comparison between the peaks and the capabilities show, as to the necessity of relying on plants other than those in Connecticut, to satisfy the commitments for firm power of the system? *A* A comparison of each peak with the corresponding capability shows that the Hartford Electric Light Company has never in the period covered found it necessary to rely on plants other than those in Connecticut, to satisfy its commitments for firm power.

[2914] *Q* The years that you have given don't include 1935 and 1936. What was the situation with respect to capability and yearly peaks between August 26th, 1935 and the period which you have already given th figure for?

Trial Examiner: Will you read the previous question back, and the answer?

(The record is read by the reporter.)

Trial Examiner: In other words, that statement means that there was sufficient there, in other words, it wasn't physically necessary, is that your answer?

The Witness: It wasn't physically necessary to take any power from out of State.

Trial Examiner: All right.

Mr. Branch: Have you the next question?

Trial Examiner: Read the next question again.

(Pending question read by the reporter.)

A I do not have the figures before me for these years. In the course of my duties as manager of the Exchange, however, I have had to keep in touch at all times with these matters, and can state positively that at no time since August 25, 1935, has The Hartford Electric Light Company had to rely upon plants other than those in Connecticut, to satisfy its commitments for firm power. Between August 25th, 1935 and March 18th, 1936, there was no out-of-State connections between Hartford Electric Light Company-Connecticut Power Company interconnected systems.

[2915] During the remainder of 1936 with the exception of a short period when the South Meadow plant was flooded and being reconditioned, there was plenty of generation in the Connecticut plants to take care of the load at all times.

* * * * * *

Q You said in answer to the question, Mr. Mayott, between August 25th, 1935 and March 18th, 1936 there was no out-of-State connection between The Hartford Electric Light Company-Connecticut Power Company interconnected system. Do you mean

by that that The Hartford Electric Light-Connecticut Power System was not connected with any out-of-State line? *A* That is correct.

* * * * * *

Q Mr. Mayott, when you previously testified, I think you gave the date at which The Connecticut Light and Power Company disconnected the connection which had been established at New Britain during that time of the flood, in 1936. Will you now [*2916*] describe what happened at about that time and how long the emergency lasted, and so forth? *A* During the second week in March, 1936, a long period of warm weather combined with extra heavy warm rains caused excessive floods on the Connecticut River and other streams in Connecticut and Massachusetts. By Wednesday, March 18th, some minor dams had been washed out and the Connecticut River was rising so rapidly that it was apparent that the power situation was becoming critical. On March 18th I was asked by Mr. C. F. Mosher, General Superintendent of the Turners Falls Power and Electric Company—I will have to make a correction. I was notified by Mr. C. F. Mosher, General Superintendent—

* * * * * *

A (Continuing) I will go back. On Wednesday, March 18th, I was notified by Mr. C. F. Mosher, General Superintendent of the Turners Falls Power and Electric Company that the New England Power Company's hydro plant at Vernon had already been shut down by high water; that it would be only a short period of time before their cap on the station would be flooded out; that a landslide was threatening the power supply from Cobble Mountain, and asked to have the Hartford-Agawam line reconnected on an emergency basis. [*2917*] The officials of The Connecticut Power Company and The Connecticut Light and Power Company were immediately notified and gave their approval for the reconnection on an emergency basis. At 1:32 P.M., on March 18th, 1936, the

Hartford-Agawam C-3 was put back in operation, and at 1:54 P.M. the Hartford Agawam D-4 was put back into operation.

During the next 24 hours I was notified that the Hampden steam plant of the Turners Falls Power and Electric Company, the Springfield steam plant of the United Electric Light Company, and the Dutch Point plant of the Hartford Electric Light Company were flooded out, in the order given. With a few hours of the Dutch Point plant being flooded, the water had risen so high that it was necessary to start shutting down the South Meadow plant. South Meadow was flooded. The last unit at South Meadow was back in service April 17th, 1936, but of course it was not certain at that time that the equipment was completely reliable, due to the immersion and the necessary haste in which it had been reconstructed. Reconditioning at the Dutch Point Plant was not completed until December, and not until then can it be said that the emergency was ended.

[*2918*] *Q* That is, December, 1936? *A* December, 1936.

Q Mr. Mayott, I think in response to some questions of Mr. Wahrenbrock when he called you as a witness for the Federal Power Commission, you testified that one of your duties as manager of the Exchange, was to prepare a schedule indicating the most economical program of generation for the Exchange for the ensuing twenty-four hour period. Do you recall instances where such schedule was not followed? *A* Yes.

Q Were those instances frequent? *A* Yes.

Q Will you state the reasons why the schedule wasn't followed? *A* Changes in load from that predicted, changes in the available capacity and line outages.

* * * * * * [*2919*]

JOHN M. KRAMARSIK,

a witness called on behalf of the Respondent, being first duly sworn, testified as follows:

Direct Examination by Mr. BRANCH.

Q Will you state your name? *A* John M. Kramarsik.

Q Will you give your home address and business address. *A* My home address is 19 Dartmouth Avenue, West Hartford; business address, 36 Pearl Street, Hartford, Connecticut.

Q Are you an official of The Connecticut Light and Power Company? *A* I am one of the assistant secretaries of The Connecticut Light and Power Company.

Q Have you had an investigation made to determine whether at any time since August 26, 1935, The Connecticut Light and Power Company has owned any stock in either The Connecticut Power Company or The Hartford Electric Light Company?

* * * * * * [*2920*]

By Mr. Branch: *Q* And what did your investigation reveal?

* * * * * *

[*2921*] The Witness: The Connecticut Light and Power Company has at no time since the date you mention had any stock ownership in any of the companies that you mentioned.

By Mr. Branch: *Q* And has either of those companies, The Connecticut Power Company or The Hartford Electric Light Company, owned any stock in The Connecticut Light and Power Company during this period?

* * * * * *

The Witness: The answer is no.

By Mr. Branch: *Q* Have you also made an investigation to determine whether any person has served simultaneously as an officer of The Connecticut Light and Power Company, on the one hand, and either The Connecticut Power Company or The Hartford Electric Light Company on the other hand?

* * * * * *

The Witness: There have been no common officers or directors.

[*2922*] By Mr. Branch: *Q* No common officers or directors; you mean between The Connecticut Light and Power Company, on the one hand, and either The Connecticut Power Company or

The Hartford Electric Light Company on the other hand? *A* That is correct.

* * * * * * [*2931*]

PROCEEDINGS.

Trial Examiner: The hearing will be in order. The Trial Examiner has reviewed some of the rulings which were reserved. Exhibit No. 52 is rejected, contract not being shown to have been in force subsequent to the enactment of the Federal Power Act.

Mr. Branch: May I ask who offered that in evidence?

Trial Examiner: That was offered by Commission counsel.

Mr. Branch: Very well.

Trial Examiner: It was originally offered on the 15th of July.

Mr. Davis: That is Exhibit 52?

Trial Examiner: Exhibit 52. The original references to it on page 997—that is where the offer is made.

(Exhibit 52 was rejected.)

Trial Examiner: Exhibit No. 71 will be admitted.

Mr. Wahrenbrock: I am sorry, I did not hear your ruling.

Trial Examiner: I said Exhibit No. 71 will be admitted.

Mr. Branch: That was offered by Commission's counsel.

Trial Examiner: That was offered by Commission's counsel. I was in error last night when I was under the impression it had been offered by the respondent.

Mr. Branch: My recollection is that I objected to that, and consequently I should like to have an exception noted.

[*2932*] Trial Examiner: You did object to it, and you may have an exception. I may say that other evidence along the same line has been introduced at the request of the respondent.

(Exhibit 71 for Identification received in evidence as Exhibit 71.)

Trial Examiner: Exhibit No. 44-C will be rejected. It is not apparent that the respondent knew of this before it was submitted to the Commission. Exhibit No. 44-E will be admitted.

Mr. Branch: And I think I objected to the admission of that, and I should like to have an exception noted.

* * * * * * [2934]

CHARLES F. SCOTT,

a witness called on behalf of the Respondent, being first duly sworn, testified as follows:

Direct Examination by Mr. BRANCH.

Q What is your name? *A* My name is Charles F. Scott.

Q Where do you reside? *A* New Haven, Connecticut.

Q What is your occupation? *A* I am Professor of Electrical Engineering, Emeritus, Yale University.

Q Will you please state your education and experience as an electrical engineer? *A* I graduated from the Ohio State University in 1885 and during the next two years continued my studies at that institution and at Johns Hopkins University, Electrical subjects being prominent. After some experience as a wireman, I entered the testing room of what is now the Westinghouse Electric and Manufacturing Company in Pittsburgh. Shortly afterwards I became a Laboratory [2935] Assistant. The Westinghouse Company, then in its second year, was developing the alternating current system which was then limited to incandescent lighting, as there was no alternating current motor, and there was no house meter for registering consumption. About the time I went to Pittsburgh in 1888, the Shallenberger meter for alternating current and the Tesla motor for alternating currents were both announced, and a general development of facilities for use with the alternating current system followed. Mr. Tesla's patents were acquired by Mr. Westinghouse and Tesla was at the works, developing the motor. I was assigned as an assistant to him. I worked under his direction and then had charge of developments in this line. I introduced certain modifications in his motor and designed a generator for operating a coal-mining machine by these motors, which I believe was the first commercial installation of the Tesla motor. I worked with Mr. Tesla for about a year.

One incident in my early experience was the testing of a pair of alternating current machines of a new type. I ran one as generator and the other as motor, both with load and without load. I learned the characteristics of the synchronous motor and also operated it as a synchronous condenser. Shortly after this experience a synchronous motor plant [*2936*] of 100 horsepower was sold, and I was given charge of the assembly of the equipment and describing and developing the apparatus for starting and for control.

This plant, the first of its kind, was installed about 1891 at Teluride, Colorado. I became Assistant Electrician and later Chief Electrician, and later Consulting Engineer of the Westinghouse Company. I had contacts with many lines of work, as well as with different kinds of specific apparatus. One of the memorable developments of the Company was the Tesla polyphase alternating current system. This had characteristics which radically changed the whole commercial electrical field, and its initial large-scale installation was at Niagara Falls. During the 80's, various electric systems had developed. Several systems for arc lighting, the Edison system for incandescent lighting, limited to about a half mile radius, the early alternating current for long-distance incandescent lighting and a current for operating street-railway motors. These various kinds of current were produced by dynamos of different types and their circuits were entirely independent. In 1890 very few machines exceeded 100 horsepower in capacity.

Trial Examiner: Just a moment, Mr. Scott. I don't believe that Commission counsel is able to hear you.

Mr. Davis: Because of the train, Professor Scott, making such a noise at the moment.

[*2937*] (Temporary suspension.)

A (Continuing) One of the memorable developments of the Company was the Tesla polyphase system. This had characteristics which radically changed the whole commercial electrical field and its initial large-scale installation was at Niagara Falls. During the 80's, various electric systems had developed, several systems

for arc lighting, the Edison system for incandescent lighting, limited to about a half-mile radius, the early alternating current for long distance incandescent lighting, and the current for the operation of street railway motors. These various kinds of current were produced by dynamos of different types and their circuits were entirely independent. In 1890 very few machines exceeded 100 horsepower in capacity. At Niagara Falls a larger power development was proposed and various systems of transmission were suggested. The Tesla system was proposed by the Westinghouse Company and I, with other engineers, engaged in the development of methods and apparatus. After the first contract for generators at Niagara had been placed, which involved two-phase machines, it was found desirable to make the transmission to Buffalo three-phase. I devised a method of transformer connection by which the power from the [*2938*] two-phase generators could be transmitted by three-phase at a greater economy, to Buffalo, and this system was adopted and used.

By Mr. Branch: *Q* Are these connections what are commonly known as the Scott connections? *A* Yes.

Q Will you continue with your description of your experience? *A* I continued having a consulting part with the early problems of Niagara, making visits to Niagara and aiding in tests over a period of several years. Later on I was interested in the development of single-phase railway systems. I came from Pittsburgh to the Professorship of Electrical Engineering at Yale in 1911. Since coming to Yale I have acted as consultant or expert for the Westinghouse Company and the General Electric Company, the New Haven Railroad, the Niagara Power Company, the Telephone Company and others. For the Telephone Company I made a visit to Italy to determine the conditions in the placing of a long distance telephone cable so as to avoid inductive disturbance from a railway which was about to be electrified. I note that a list of papers presented before the American Institute of Electrical Engineers prior to 1900 includes five papers under the heading of "Power Transmission". The first and [*2939*] the last of these

carry my name. I was President of the American Institute of Electrical Engineers in 1902, '03, and have kept active in connection with it ever since. In its Transactions are papers which I presented, and I wrote voluminously for the Electric Journal, which I originated and for a number of years directed while I was with the Westinghouse Company. I became Professor Emeritus at Yale in 1933. I have been Chairman since its organization in 1935 of the Connecticut Board of Registration for professional engineers, and land surveyors, and last Friday was re-elected for the coming year. Two years ago I served a term as President of the National Council of State Boards of Engineering Examiners.

Q Do the terms "transmission" and "local distribution" have generally accepted meanings in the electrical power industry? *A* Yes.

Q Are you familiar with the generally accepted meanings which those terms have in that industry? *A* I believe I am.

Q Did those terms have the same generally accepted meaning in 1935 as they do now? *A*. I believe so.

Q What is the basis of your familiarity with those terms [2940] as used in the electric industry? *A* My long-term technical and general interest in electrical power and the giving of instruction in the subject until I retired as a teacher, in 1933. Since then I have not been actually teaching, but have kept myself posted on the developments in this field, in much the same manner as prior to 1933.

Q Will you explain the meanings of those terms, "transmission" and "local distribution," as generally understood and used in the electrical industry? *A* "Transmission"is generally used to apply to the conveying of large units of power over considerable distance at high voltage to localities where it is to be utilized. The distribution function is to deliver this power—

Mr. Wahrenbrock: Can we have just a moment? Not quite so fast. I would like to make a few notes, as you go along. May I have the reporter read the part of the answer which has already been given?

Trial Examiner: Will the reporter read back that portion of the answer already given?

(The portion of the answer is read by the reporter.)

[*2941*] By Mr. Branch: *Q* Will you continue. *A* The distribution function is to deliver this power in suitable form for use by industries or in domestic service or otherwise.

Q Is there any clearly defined line of demarcation in the generally accepted use of these terms, between "transmission" on the one hand, and "local distribution," on the other? *A* The distinction is rather one of function than of definite of quantities. There is, for example, no particular distance or no particular voltage or amount of power which may be distinguished one from the other. What in one place and under certain circumstances might be properly considered as transmission may, under other circumstances, employ greater power or greater distance, or greater voltage in what is termed a distribution system. Distribution obviously cannot be predicated upon the voltage employed. 220 volts may be adequate for a few city blocks, but not for a city. 2300 volts may serve a city of certain dimensions, but would not be adequate for rural electrification to farmers and scattered hamlets. Broadly, the terms "distribution" and "transmission" are relative terms. A transformer may supply the various residences and stores in a city block. Here the distribution is at, say 110 or 220 volts, and the 2300 volts primary circuit [*2942*] to the transformer may be called a transmission line from the city station. Furthermore, the circuits to the several parts of the city may be considered as the distributing circuits, which are in turn supplied by an incoming circuit at, say, 13,000 volts, which relatively might be called a transmission circuit.

Again, the 13,000 volt circuit may supply a number of localities from a substation, which in turn receives its power from a 66,000 volt circuit. In this case, the 13,000 volt circuit performs a distributing function, and the 66,000 volt circuit is a transmission circuit which delivers power by wholesale to be distributed through various circuits as may be economical and appropriate for serving

the residences and other customers. Hence, if we attempt to classify one link in the system by relating it to an adjacent link, we encounter the dilemma of finding that it might appear more like transmission if we compared it to the link toward the consumer, and distribution if we compared it with the link toward the source of power. A valid classification, therefore, must contemplate everything between the generator and the ultimate consumer. Of course, all circuits actually transmit power, but the term "transmission," from the engineering viewpoint, is primarily associated with the source of power, whereas "distribution" is primarily associated with the destination and employment of [2943] electric power. At the source—

Trial Examiner: Will you suspend a moment?

Mr. Wahrenbrock: Before the witness continues, may I have the last two or three sentences read?

Trial Examiner: The reporter will read the last two or three sentences for the benefit of Commission's counsel.

(Whereupon the last three sentences of the answer as above recorded, were read by the reporter.)

The Witness: At the source, the kind of current adapted must be suited to large scale production and to long distance transmission. At the destination, the needs of the consumer dictate the kind of current. It must be suited for lamps or motors or furnaces, or electroplating, or other uses to which electric power is put. Hence, in dividing an actual system into two divisions, namely, transmission and distribution, the classification should logically be made on the basis of function performed. Facilities are designed, on the one hand, with an eye to the power source, and the problem of long distance, high voltage transmission; and on the other hand, with an eye to the problem of supplying the particular needs of customers in the most efficient and economical fashion, in view of the particular geographical and local conditions. Ordinarily, in the region hereabout, the facilities by which large units of power at wholesale are transmitted from a [2944] source at 66,000 volts across country to steel towers, were designed

to fulfill the transmission function and the facilities of the purchaser by means of which the voltage is reduced and put in process of delivery to customers of various types and groupings were designed to fulfill the function of distribution.

Mr. Wahrenbrock: May I have that last sentence read again, please?

Trial Examiner: The last sentence will be read for benefit of Commission's counsel.

(The last sentence of the answer as above recorded, was read by the reporter.)

By Mr. Branch: *Q* Will you continue? *A* Ordinarily, therefore, since transmission logically ceases where the wholesale delivery of power occurs, and the further facilities have close relation to the delivery of power to the retail customer, the classification of an actual system into two divisions should be made at that point, so that the substation and circuits emanating from it would be included within the term "distribution".

Q I am going to read to you a quotation from the testimony of Mr. Thomas, it being a statement which he made in making a distinction between the terms "distribution" and "local distribution". This is the statement:

> "Distribution of energy in a utility system is a sub- [2945] dividing of the bulk energy delivered to the neighborhood among the various customers. Local distribution narrows the operation down to a group of consumers so closely associated as to use common distribution facilities without the necessity of considering the element of transmission between members of the group."

That is the end of the quotation. What have you to say in regard to the distinction indicated in that statement? *A* I cannot agree that it is a recognized distinction. In my experience, there is no such generally accepted distinction between the terms "local distribution" and "distribution". I regard the word "local" as

conveniently descriptive of distribution as contrasted with the term "long distance", when applied to transmission.

Q Are you familiar with the facilities of the Connecticut Light and Power Company in and about its substation at Bristol? *A* Yes. I have personally visited the station, and as a result of my examination have, believe, a correct idea of the various types of apparatus and their function. I have also examined Exhibits No. 28, 82, and 38.

Q Those numbers refer to Exhibits which are in evidence in this case? Are they, Professor Scott? *A* I so understand.

Q Assuming, as has been testified in this case, that all of the apparatus in the Bristol substation beyond the strain [*2946*] insulators at the end of the Connecticut Power transmission line, except certain apparatus connected with the operation of certain circuit breakers at Bristol Mountain to Tower 474 is owned by the Connecticut Light and Power Company, in your opinion as an engineer, on the basis of your explanation of the term, should those facilities of the Connecticut Light and Power Company in and about the Bristol substation properly be classified as facilities for transmission or as facilities used in local distribution? *A* In my opinion, they are facilities used in local distribution.

Q Will you explain? *A* The principal facilities in the substation at Bristol are the transformers and the synchronous condenser. These facilities seem to me to be clearly a part of the local distribution system. The transformers have been designed to supply energy at two particular voltages which are suited to the requirements of the Bristol distribution system. The transformers, as I understood, were specified by the engineer of the Connecticut Light and Power Company to meet the particular conditions and requirements of this distribution system. This, to my mind, makes their design, installation, and operation for the specific purposes, and to meet the specific requirements of a distribution system. Certain apparatus, including the lightning arrestors and the switches are for the protection and oper- [*2947*] ation of the transformers, and are therefore simply auxiliary to them. The

synchronous condenser performs two functions directly related to the distribution system. The first of these is the maintenance of a steady voltage on the distribution system; the second function of the synchronous condenser may be illustrated as follows: Induction motors require for their operation two kinds of current. One is a magnetizing current required when the motor is loaded, and also when it is running empty. The other is the power current which varies in proportion to the power delivered by the motor. The synchronous condenser produces the magnetizing current which is necessary to the proper operation of the distribution system, and therefore is an element in the local distribution system. Thus, the transmission properly ends with the termination of the Connecticut Power Company's line.

By Mr. Branch: *Q* Are you familiar with the facilities of The Connecticut Light and Power Company in what has been called the East Hampton district? *A* Yes. I have made careful study of the maps and diagrams in evidence as Exhibits 26 and 39.

Q 39? *A* 38. And have read the testimony of Mr. Colvin, starting on page 1795, and Mr. Thomas, starting on page 1290 and again on page 1356.

[*2948*] *Q* In your opinion as an engineer, are the facilities of The Connecticut Light and Power Company in that East Hampton District facilities used in local distribution, based on your explanation of the meaning of that term? *A* I consider them as facilities used in local distribution. In its simplest form—

Q Just a minute. Have you anything particular to say about the Leesville Generating Plant? *A* It may be considered as a part of the power production or generating system, and is a relatively small element in the general system.

Q Will you explain why you consider the other facilities as facilities used in local distribution? *A* In its simplest form, transmission is found in a circuit from a distant water power and distribution in the substation in which the voltage is reduced and current is supplied through radiating circuits. In modern extended power systems, however, there may be several links or stages between

source and consumer, in order to meet the actual conditions by the most economical methods. Successive circuits, for example, may be operated at 66,000, 13,000, 2,300 and 220 volts. An intermediate section may seem to be distribution to what immediately follows and transmission—I will correct. An intermediate section may seem to be distribution to what immediately precedes and transmission to what immediately [*2949*] follows, but its true function is its function in the system as a whole. Is the primary function, therefore, to distribute and deliver power in large units or is it for delivering to the consumers the wholesale power in the particular form which they need?

Q Just a minute. Mr. Scott, I think you said, you phrased that question: "Is it the primary function to distribute and deliver power?" Is that what you mean to say? *A* What I intended to say was, to ask the question: "Is it the primary function to transmit and deliver power in large units or on the other hand is it for delivering power to the consumers, which is received in wholesale and distributing this power then to the consumers in the form which they need?"

Q Will you continue with your explanation? *A* If the latter, the function is distribution, although the specific conditions may be most economically met by employing different voltages in different parts of the system, an engineering expedient which does not change its function. At the substation in Middletown, the 66,000 volt circuit terminated, and the energy was transformed to about 4,000 volts and 13,000 volts. From that substation several circuits emanated, from one of which customers in Middletown were served. Furthermore, from the substation in Portland, various circuits supplied factories at about 13,000 volts and commercial and [*2950*] domestic consumers at about 4,000 volts. The circuit which ran from the substation in Portland to Pole No. 110, a distance of nearly a half mile, was tapped to serve residential customers. Thus it appears that even before the energy had reached Pole No. 110 at which the facilities of The Connecticut Light and Power Company began, it had been transformed into two different

voltages and supplied over various circuits to many customers of different types and different locations. From Pole 110, where the energy was metered, the energy went to two substations of The Connecticut Light and Power Company at about 13,000 volts. One of these was the Collins Hill substation and the other the West High substation, both of which customers of the company were served; from the West High substation circuits operating at about 13,000 volts went to various substations from which customers were supplied, including the Leesville substation and those at Comstock Bridge, Westchester and Colchester. Looking at the matter as it is regarded in the industry, some of the points I note are as follows: Clearly the main purpose of this line was to make energy available to many customers in scattered groups. The system is in the country. Its function is distribution to ultimate consumers; since it is in the country we naturally expect that the distances between customers will be greater than in an urban [*2951*] area. These distances between customers do not alter the characteristics, which are distribution. I notice that the voltages about 13,000 volts and 2,300 volts, are characteristic of distribution. In a thickly settled city, where voltages are used for distribution, these values are found. We have here a system which is like the distribution in the City, except that it is spread out. In general, moreover, the lines have the characteristic of ordinary distribution lines.

Q Professor Scott, you have talked about the lines and have expressed your opinion generally about the facilities. Would your characterization of the facilities in this area, as facilities used in local distribution, include the substations which you have mentioned, belonging to The Connecticut Light and Power Company with the transformers and other incidental apparatus? *A* Yes. I regard the system including these substations and the lines to them and the lines from them, as being devised and planned from the standpoint of reaching the customer, and from the general classification which I gave when it is the needs of the customer and the

circuit for supplying those particular needs, I class that as primarily distribution.

Q Are you familiar with the facilities of The Connecticut Light and Power Company in the Torrington-Winsted District? *A* Yes, I have made a study of the maps and diagrams in [*2952*] evidence as Exhibits 27, 38 and 79, and have read the testimony of Mr. Colvin starting on page 1776 and the testimony of Mr. Thomas, starting on page 1298, and the other testimony starting on page 1318.

Mr. Wahrenbrock: May I have those exhibit numbers again?

Trial Examiner: Is that other testimony of Mr. Thomas on page 1318? You said "the other testimony on page 1318." Is that other testimony of Mr. Thomas's?

The Witness: Correct.

Mr. Branch: May I proceed?

Mr. Wahrenbrock: I would like to have those exhibit numbers, please.

Trial Examiner: The witness has not answered my question yet, as I understand it.

The Witness: I said "Correct."

Mr. Wahrenbrock: May I have those exhibit numbers that you just gave?

Trial Examiner: Will you state the exhibit numbers again?

The Witness: 27, 38 and 79.

Mr. Wahrenbrock: Thank you.

By Mr. Branch: *Q* Now, I think you were interrupted, Mr. Scott. Will you indicate the pages on which the testimony you read was, again,—all the different groups? *A* The testimony of Mr. Colvin starting on page 1776, the [*2953*] testimony of Mr. Thomas starting on page 1298, and the other testimony of Mr. Thomas on page 1318.

Trial Examiner: We will suspend a moment, please.

(Temporary suspension.)

By Mr. Branch: *Q* I think we haven't yet got the thing complete. Have you also read some testimony of Mr. Hughes? If

so, what testimony? *A* I have a reference in my notes to certain pages of Mr. Hughes' testimony, but at the moment I do not directly recall having read those sections, in addition to the others.

Q In your opinion as an engineer are the facilities of The Connecticut Light and Power Company in the Winsted-Torrington District facilities for transmission or facilities used in local distribution, based on your explanation of those terms?

Mr. Wahrenbrock: Mr. Examiner, before that question is answered, I would like to interpose an objection to that question and to the examination of this witness on the character of the facilities at Torrington and Winsted, on the ground that his study is based upon some not well-defined testimony of Mr. Hughes' and I submit that the status of the record with respect to the testimony of Mr. Hughes on the facilities of The Connecticut Light and Power Company at Torrington is—

Trial Examiner: Are you talking now about Torrington or [*2954*] Winsted?

Mr. Wahrenbrock: Torrington. It is in such a shape that that requires an appraisal and a weighing which is a function of the Commission, and not of a witness who is put on.

Mr. Branch: I think, Mr. Examiner, Mr. Wahrenbrock misunderstood. I understood the witness to say that he did not, although he had some references in his notes, he wasn't basing it on testimony of Mr. Hughes.

Trial Examiner: I understood the witness to say that he did not recall having read the testimony of Mr. Hughes.

Mr. Wahrenbrock: My understanding was that his notes indicated that he had, but he couldn't say which portions. I think that should be definitely cleared up.

[*2955*] Trial Examiner: Mr. Scott, do I understand that you did read the testimony of Mr. Hughes, or just a portion of the testimony of Mr. Hughes?

The Witness: I may explain by saying that there are quite a number of these references, both to the diagrams and to the testimony, and that in looking over this testimony I read quite a

number of these, some of these references covering several pages, and that my memory at the moment does not serve me as to whether I actually did read Mr. Hughes's testimony or not, so that I have refrained from making a positive statement that I had.

By Mr. Branch: *Q* Very well. In your opinion as an engineer, are the facilities of the Connecticut Light and Power Company in the Winsted-Torrington district, facilities for transmission or facilities used in local distribution, based on your explanation of these terms?

Mr. Wahrenbrock: I must object to that question on the grounds I have stated, Mr. Examiner.

Mr. Branch: Well, I think it is perfectly clear now.

Trial Examiner: I don't think that Mr. Hughes was the only witness that saw it. I would like to ask one question of the witness, whether he saw these facilities himself?

The Witness: I have not.

Mr. Branch: I don't think that that makes it invalid. [*2956*] Of course, Mr. Thomas couldn't have seen the facilities at East Hampton, as they existed as of the time that he saw them; at least it appeared that he didn't see them, yet he went ahead and testified. And Mr. Thomas, I think, also stated what I should suppose would be equally applicable, when I cross-examined him, as to various facilities that an engineer can get an idea of facilities from maps and diagrams, and so forth. Now, it appears that this witness has studied the exhibits which show these things. He has read the testimony of Mr. Colvin, the testimony of Mr. Thomas, and consequently he is in a position to express his opinion.

Trial Examiner: There seems to be so little question in regard to that. However, it seems to the Trial Examiner that the question of the doubt involved there goes to the weight and not to the admissibility of the testimony.

Mr. Branch: Mr. Examiner, the matter of the physical inspection of the facilities in the case of the Torrington facilities rests on entirely different grounds than those in the case of the East

Hampton facilities, because in the case of the Torrington facilities there is this problem created by the nature of Mr. Hughes's testimony, and if the witness read parts of that testimony, and has not personally viewed the facilities in order that he may have corrected any misapprehension he may have gained from partial reading of Mr. Hughes's testimony, then I submit no proper basis has been laid [*2957*] in the study shown to have been made by the witness for him to give the opinion which he is now called on to give.

Trial Examiner: I think that that goes to the weight and value of the opinion, and not to its admissibility. The witness will be permitted to answer.

By Mr. Branch: *Q* Will you answer the question, please? *A* I should classify all the facilities of the Connecticut Light and Power Company in this district as facilities for local distribution, except the facilities of the Robertsville plant, which I would call facilities for generation. Most of what I have said—

Q Will you explain? *A* Most of what I have said about Middletown is applicable here. The facts regarding voltage and distance, while they should be considered, are not determinative, for, as I have said before, the test is not a quantitative one. The principal point of difference is the stepped-up line, stepped-up in voltage, which runs to Winsted. The characteristics of this line differ from those usually associated with transmission facilities. Transmission lines are characteristically, though not always, carried on high steel towers, and are not found along city streets or highways, whereas the Torrington-Winsted line is carried on wooden poles, and for at least a part of the way along city streets and highways in the manner usually [*2958*] associated with lines for local distribution. Higher voltage that the Torrington system is employed merely for engineering reasons. Formerly it served several customers, as I understand, and in this it was clearly fulfilling a function of distribution. Reduction in the number of customers served does not justify a change of classification from distribution to transmission, where substantially the same contruc-

tion is used and the function and general characteristics remain the same. Taking a comprehensive view of the system, distribution began at Torrington, where the transmission of the Connecticut Power Company delivered power to the Torrington Electric Light Company.

* * * * * * [2959]

Cross Examination by Mr. WAHRENBROCK.

Q Professor Scott, what is the voltage of the generating plant at Robertsville? *A* I do not know.

Q Well, have you any notes or materials by which you can tell what that voltage is? *A* Not at hand. I could probably get it from the records in a moment.

Q Well, do you know what the voltage of the line which connects the generating plant with the Winsted substation is?

* * * * * *

The Witness: I have been subjected to so many figures with regard to voltages, and so on, at different parts of the line, that as a matter of memory, I do not have that.

[2960] By Mr. Wahrenbrock: *Q* Well, do you know what the voltage of the distribution system in Winsted is? *A* My best recollection there is that the voltage is reduced by the transformer to, I believe, 2300.

Q Well, is there a transformer in the line between Robertsville and the substation in Winsted?

* * * * * * [2961]

Mr. Branch: Well, this gentleman is a bit deaf, and the Examiner made a statement which I think he is entitled to hear, and I don't think he heard it.

Trial Examiner: Do you fully understand the situation now? Can you hear me? Mr. Scott, can you hear me?

The Witness: Yes, I think I heard everything, and if I may ask you, whether this is a question, a test of my memory and my

knowledge of it, or whether it is a method of getting the facts, and if it is a case of getting the facts, I would like to refresh my memory by looking at the diagrams.

Trial Examiner: If you wish to do that, you may.

Mr. Wahrenbrock: Mr. Examiner, I should like to test the witness's familiarity with the facts which are relevant and [*2962*] material to the conclusions which he has expressed, without reference to any diagrams or notes, please.

Trial Examiner: I think that has already been shown as far as this matter is concerned. The witness does not have a recollection in his own mind of it.

Mr. Wahrenbrock: May I see what the answer to the question about the transformer is?

Trial Examiner: Well, the witness says that he doesn't know without reference to the diagram.

Mr. Wahrenbrock: I don't believe that has been stated.

Trial Examiner: Is that not the case, Mr. Scott?

The Witness: Yes, sir. I consulted the diagrams, and have formed an opinion as to the general functions of the system, without taxing my memory with the particular voltages or the particular transformers involved.

Trial Examiner: I see. In other words, you could only state with the assistance of diagrams what the voltages were or what the transformers were?

The Witness: I do recall the diagram gives two banks of transformers, each of 1500 k.v. in the Winsted station.

Trial Examiner: But that is not between Winsted and Robertsville?

The Witness: And my best recollection is that the voltage line, that the line which comes up from Winsted is continued on to the other station. But I consider that as secondary to [*2963*] the general layout and general purposes of that system, and have not taxed my memory with it.

Trial Examiner: It is so understood.

Mr. Wahrenbrock: I think that will forward our examination without the necessity of referring to the diagrams.

By Mr. Wahrenbrock: *Q* I would like to ask whether I understood what you were saying to the Examiner, what you were saying to the Examiner with respect to the line from Torrrington to Winsted. Did I understand that you stated that that line, or an extension of that line, goes on to the Robertsville plant? *A* I said that I thought that was likely the case, though I am not certain.

[*2964*] *Q* At any rate, your recollection is that the voltage between Robertsville and Winsted is about the same order comparable to the voltage between Winsted and Torrington? *A* My general impression is Yes.

Q What is the neighborhood of the voltage between Torrington and Winsted? *A* 27,000.

Q Is that a one-circuit or a two-circuit line? *A* A two-circuit line.

Q Do you know how many customers are served from that line? *A* The diagram shows one customer served from one of the lines at an intermediate point.

Q Is any customer served between Torrington and Winsted from the other line? *A* The diagram that I examined did not show any connection from the other line.

Q I said "line" and you did too. I believe we both meant "circuit". *A* Very good.

Q I would like to turn to the Bristol situation briefly. I believe I understood from what you said that there was a 13,800 volt system to deliver electric energy to some industrial customers? *A* Correct.

[*2965*] *Q* And that there is a 4,600 volt system for distribution of energy to other customers? *A* Correct.

Q Now, leaving out of account for the moment the 13,800 volt system, forgetting that for the moment, and considering only the 4.6 k. v. system, if there were sufficient generating capacity operating at 4,600 volts in Hartford, what would be necessary, in

order to utilize that generating capacity to supply the load of the 4,600 volt system in Bristol?

* * * * * * [2967]

A An electric circuit connecting the two points which is designed as suitable for carrying the required power the specified distance.

By Mr. Wahrenbrock: *Q* Over such a distance, what would be the enonomical voltage to utilize in that circuit? *A* The distance I do not have in mind, except in a general impression. In general, however, a voltage of on the order of 1,000 volts per mile or somewhat higher would be in general satisfactory.

[2968] *Q* Assume that the distance is about 26 miles, what voltage would you say would be an efficient, economical voltage to utilize? *A* A voltage on the order of 30,000.

Q Now with a 4,600-volt generator and a 4,600-volt distribution system in Bristol, how would the 30,000 volt line or circuit that you have spoken of be fed, by what facilities? *A* Through raising and lowering transformers.

Q That is, there would be a step-up transformer at Hartford? *A* Correct.

Q That would step the voltage up from 4,600 to 30,000 at Hartford? *A* Correct.

Q And there would be a step-down transformer at Bristol? *A* Correct.

Q And it would step the voltage down from 30,000 to 4,600 again? *A* Correct.

Q And would you call that a transmission circuit?

Mr. Branch: Well, I think "that" is rather vague. It ought to be specified what he means, and I object to that.

Trial Examiner: I think counsel may well make himself a little more clear.

[2969] Mr. Wahrenbrock: Well, I understood the witness to say that in order to make the generating capacity at Hartford

available for distribution of electric energy in Bristol, it would be necessary to provide a circuit.

The Witness: That is correct.

[*2970*] *Q* And would you call that circuit a transmission circuit? *A* If it is coming from a power source in Hartford, and delivering to Bristol, according to the definitions that I have given, I should say that it was.

* * * * * *

Q I just wanted to make sure I understand that with the generating capacity at a voltage of 4,600 volts available in Hartford and a 4,600 volt distribution system in Bristol, to be supplied from Hartford, it would be necessary to add a trans- [*2971*] mission circuit consisting of the step-up transformer, the transmission line, and the step-down transformer. Am I right in that understanding? *A* That would be the normal and usual method by which engineers would meet that situation, yes.

Q And the step-up transformer, the transmission line, and the step-down transformer are the facilities which would have to be supplied in order to accomplish that purpose? *A* That is correct.

Q Could the purpose have been accomplished in any other way? *A* The transformer could be omitted and the line run at 4600 volts, but the amount of copper required in proportion to the energy delivered would be excessive, and that would ordinarily not be the economical way of making the transmission.

Q I wish to return to the Winsted to Torrington line, or the Torrington line to Winsted line, and I believe that you said something about the location of that line. In order that I may be sure that I am correct, will you state whether you said that that line was located along the highway or on the highway? *A* I said that during a part of the line it ran along the streets of Torrington, and I do not recall that I definitely stated the character of the line across country, whether that was on private right of way or highway. My impression is it was the highway.

[2972] *Q* Would you like to refer to the manuscript from which you read your direct testimony? *A* Yes.

Mr. Wahrenbrock: May the record show the witness is so referring?

Trial Examiner: The record will show that.

The Witness: Reading from the testimony I gave a little while ago: The Torrington-Winsted line is carried on wooden poles, and for at least part of the way along city streets and highways in the manner usually associated with lines for local distribution. I think that covers the point.

By Mr. Wahrenbrock: *Q* Yes. Now, do I understand the force of what you there said to be that you based your conclusion as to the function served by the line between Torrington and Winsted on several factors, including among others, the location of the line as you have stated, and the fact that it was a wooden pole construction?

* * * * * *

The Witness: In general, that is correct. I gave the general conclusion that the services from the Torrington [2973] station should be considered as distribution on account of the function they performed, of getting the power which was received at wholesale from the Connecticut Power line, which was delivered to the Torrington station, for delivery in that general district, partly in Torrington and partly in Winsted and vicinity, and that looking at the system as a whole, from generation to utilization the circuits and service from Torrington station were in the nature of distribution, and laid out in the best way to get the electric service to the various customers. And then I incidentally mentioned that the type of construction which was used in the line from Torrington to Winsted was different from the construction of the transmission line which served Torrington, and was of the form of construction, which was common to distributing systems.

Q Yes. Well, do I understand then that you looked at the entire region centering around Torrington, and considered the

nature of facilities radiating out from Torrington, and among those facilities you considered the line which leads to Winsted, and you took into account the location of that line along highways, and its wooden pole construction, in coming to your conclusion that you stated on direct examination? *A* That is correct. And in that whole system of receiving power from another place, there was one element up to the Torrington station which was considered as transmission, and its voltage and construction, and so forth and so on, were [*2974*] appropriate to the delivery of power in large quantity, whereas the circuit from Torrington to Winsted was of a different character, adapted for lower voltage, and with the construction ordinarily used in lower voltage service.

[*2975*] *Q* Well now, suppose that the Torrington Electric Light Company, instead of obtaining its supply of electric energy from the 66 k. v. lines of the Connecticut Power Company, obtained all of the electric energy which it received and which it sold to The Connecticut Light and Power Company by its own generating capacity in Torrington, would that affect your conclusion as to the function performed by the Torrington-to-Winsted line? *A* Under the conditions you have just cited, we have a system in which the power source is at Torrington and, as I have pointed out in my testimony, the matter of transmission and distribution are relative terms, and you have now a smaller system to consider and the line to Winsted taken directly from the power source to a point of distribution might be considered as a transmission line. All that shows that the transmission and distribution are not matters of particular voltage or what not, but in my view the whole system in each case from the power production to the ultimate consumer must be considered.

Q About this location of the Torrington-to-Winsted line, how long is that line? *A* Ten miles, or a little more.

Q And how much of that ten miles would you say is located on City streets or the highways? *A* My recollection from the map is that it is something [*2976*] less than a mile.

Q And it is your recollection that the remaining nine miles of the line are located where? *A* They are shown on the diagram as straight lines, presumably along the highway.

Q On the highway right-of-way or on a privately-owned right-of-way? *A* It would be simply assumption on my part. I do not know the facts—along the public highway.

Q Well, I would like to be corrected, if I misunderstood what you said a little bit ago, that in considering the nature of all of the facilities in the region radiating out from Torrington, and particularly considering the nature of this one line radiating out from Torrington, you took into account its location along City streets and highways, and this woodpole construction, and so forth, am I right in my recollection? *A* I take it that you are, and in considering the system as a whole, with a 66,000 volt line delivering wholesale power to Torrington, in that system this line from Torrington to Winsted was of a different character and did not class in that system as a transmission line.

Q And I understand too, that if, instead of being supplied from The Connecticut Power Company's lines, 66,000 volt line, the supply had been by a local generator in Torrington, that then the relative situation changes? [*2977*] *A* Then we are considering a different system.

Q Now, let me ask if this line from Torrington to Winsted were 27 miles long and if the greater part of that distance, except where it actually entered towns at each end, if the greater part of that distance the line led over privately-owned rights-of-way, not on or immediately adjacent to the highway, if that would affect your conclusion any? *A* That conclusion being that if the line from Torrington is considered as a part of the general system in which it is aiding in distributing the wholesale power received at Torrington, it would be considered as a part of the distribution system. Second, that if there is no transmission to Torrington, but Torrington has its own generators and the line then becomes a part of a different system, it might be properly considered as a

transmission line. Your present question, if I can have one second—

Q I was leaving that question to one side, which I thought was disposed of by the previous answers, and seeking to put a separate question now, and that is: With the supply of energy from The Connecticut Power Company's 66 k. v. line as it is at present, but with the line from Torrington to Winsted being 27 miles long, and instead of going along on the highway, going on a privately-owned right-of-way for the greater part of the distance, if that would affect your conclusion?

* * * * * * [2978]

A I think the conditions as I recited them in my preliminary answer a moment ago still apply. If we are considering that as a part of the whole system and a part of the distribution of the wholesale power received at Torrington, we can consider it as a part of the distribution system, if it be from power generated in Torrington as a part of the transmission system. We are here encountering the difficulty of applying certain general terms to a lot of specific and complicated conditions, and, as I said in my direct testimony, we are apt to get into dilemmas because sometimes the same element in the system may be performing two functions or the same physical element sometimes one function as a part of one system and at another time another function as a part of a different system.

* * * * * * [2979]

Q Professor Scott, is there any difference between what the Torrington-Winsted line does when the 66 k.v. line of the Connecticut Power is the source of supply of electric energy, and what it does or what it would do if a generator at Torrington was the source of supply of electric energy? *A* It would be substantially the same. In my direct testimony I said the performance of a particular section of a system, as to whether that is transmission or distribution, may be determined by what follows, or by what precedes, transmission and distribution being relative terms. And

here, what precedes in one case is simply a powerhouse, when the generators are in Torrington, and we can consider it as a transmission line. If it is, however, a part of the general system in which there is transmission ahead of it, then with respect to its place in that large system, I would consider it as distribution. That may be somewhat fanciful, but it is the difficulty in applying certain general terms to specific cases.

Q But actually, as far as the line itself is concerned, there is no difference in what it does? *A* Correct.

Q I believe you have stated that the synchronous condenser at Bristol serves two functions, one of which was to maintain a constant voltage for the distribution circuits [*2980*] there. Does the synchronous condenser cause the distribution voltage to remain constant, when presumably there is a tendency for it to vary, by altering the conditions of current flow in the distribution itself, or by varying them in the transformers and the transmission lines? *A* May I have the question read?

* * * * * *

The Witness: An alternating current machine has a field excitation and produces electromotive force. It does this whether the machine is used as a generator in the powerhouse or as a synchronous motor delivering power to customers—or as a synchronous condenser which runs idle, as far as the delivery of power is concerned. Now, when this machine is used in the Bristol powerhouse, the voltage produced by the machine is controlled by its field current. This therefore is a simple means of producing the desired voltage, and holding it at the desired value in the Bristol substation. The operation of the machine leads to readjustment or equalization through the power system back to the generator. A part of the electromotive force which might be produced in the generating station, for example, by the placing of this synchronous condenser there, is on the other hand, pro- [*2981*] duced at the Bristol station where the voltage is required to be held at constant value, and there is internally within the system the proper

interchange of current which enables one machine operating at Bristol to work in parallel with the machines at the generating station. On the other hand, the current and service on the local services are the same whether the station voltage is determined by the local synchronous converter—synchronous condenser, I mean, or whether that voltage were attained by changing the transformer ratio, or by readjustment of voltage at the power station. In brief, therefore, the method of maintaining voltage by the synchronous condenser does not directly affect the distribution circuits to customers, but that is the same that it would be if the voltage were secured by some other means. There is a flow of current adjusting the synchronous condenser in the substation to the generators which supply the system.

Q In connection with your testimony about East Hampton, I made a note of one point that after referring to the voltage by which Middletown is supplied, you spoke of two subsequent voltages. Did I understand that you meant that before the circuits reached Pole 110 there had been two step-down stages? *A* No. I intended there to indicate that the voltage in Middletown was lowered to two values, one, the 13,000 volts, if I recall, which goes over to Portland, and beyond; and the other a lower voltage for local distribution in and about [*2982*] Middletown.

Q Well then, that lower voltage has nothing to do with the circuit that goes over to Pole 110? *A* Correct.

Q With that in mind, do you have the distances in mind from Pole 110 to the—I will have to refer to the diagram in order to complete my question. Do you have in mind the distance from Pole 110 to the West High Street substation? *A* As I recall, that is the first substation east, and by a comparison of the scale on the map it is between four and five miles. I think approximately four miles in a straight line, and there is a little wiggle to it that would add something to that.

Q Now, is it your understanding that any customers are served from that line between Pole 110 and the West High Street substation? *A* I think there are none.

Q And is it your understanding that there are any customers served between the West High Street substation and the Leesville substation? *A* I believe there are none.

Q Are there any customers served from the line between the West High Street substation and the Comstock Bridge substation? [*2983*] *A* I do not recall any indication of that.

Q And between that substation and the Westchester substation? *A* The same.

Q And between the Westchester substation and the Colchester substation? *A* The same answer.

Q Then do I understand that at each of those substations there are step-down transformers? *A* So I understand.

Q And from the secondaries of those step-down transformers there are radiating lines at lower voltages from which customers are served? *A* So I understand.

Q In one of your earlier statements on direct examination, I believe that you referred to transmission as being the conveying of large units of power over considerable distances at high voltage to localities where it was to be utilized. Am I substantially correct in that recollection? *A* You are.

Q What did you have in mind by "localities"? What is the conception of "localities" which you had in mind, which you have in mind, when you make that statement? *A* A place or a district where the power is to be used.

Q Well, how large? What bounds the district? What [*2984*] bounds the locality? *A* The location of the customers to be served, if you choose. I have indicated that a distribution system might properly be applied to a few city blocks in one case, or a small city in another, or rural electrifications where many miles are to be covered, to reach farms and small hamlets.

Q Taking the first instance, where the locality would consist of a few blocks, under what circumstances would that be true? *A* I think I gave an illustration there that in service in a city a 2,300 volt line from the station might supply several City blocks, in which transformers reduced the voltage to say 220 volts and

that was distributed from that transformer through a few thousand feet covering some city blocks, a few city blocks.

* * * * * * [2985]

Q The 2300 volt lines radiating out would cover the locality, and with their sub-lines, they would supply all of the customers in that locality that you had in mind. *A* I think my idea was a little different from that. I wish to show that the matter of distribution didn't depend on voltage or exact area, but was a function to be performed. If for a few city blocks we have one transformer which supplies the customers in that block by radiating lines from it, that might be considered as the distribution area of those city blocks, and the link in the system, the 2300 volt circuit from the local station to it, is relative to it, a transmission supplying that few blocks as the distribution area. From another viewpoint, the city station itself with its radiating 2300 volt lines may be considered as a larger area of distribution from the city station, which in turn may receive the current from a different point, in which the line to the station is transmission, and the whole city is the distribution area. Again, the supply to that city may be a part of the system in which from a source, current is supplied at maybe 13,000 volts to a number of areas, towns, or small cities, and in that case the relationship would be distribution at 13,000 volts [2986] from a point where power was received in larger bulk. Transmission and distribution then being relative terms, and if you take any two adjacent elements, links in the system, one link may serve as transmission to what is beyond, and it may serve as distribution when compared with the links back toward the generator. The whole thing is artificial in a way, and relative, and so that the best answer I have been able to give to the whole situation is that it is a relative situation, and not an absolute one, depending on the particular conditions, and one particular line may serve, looked at one way, as transmission, and looked at another way, as distribution, and you can imagine cir-

cumstances in which it may be seeming to perform both functions at once.

Q Well, then, you could look at the matter more largely, look at a State the size of the State of Connecticut, and say that even on a larger scale there was distribution over the whole State, could you? *A* If in the whole State the power were received from the original source or sources of power, at a high voltage, and the power was delivered at certain places in wholesale form, in large amounts, which are then taken locally and distributed to customers, why, yes.

Q Well, in the same way then, if a huge giant power or super power gridwork, covering the whole United States, [*2987*] were constructed to supply all the communities in the United States, you could say that that system distributed the electric energy on it throughout the United States in the same way? *A* And you are leading up to the fact that in general the whole electrical system, large as it may be, the United States if you choose, involves many links, and all of those are actually transmitting power, and the whole system is for the purpose of distributing power from the sources to the different consumers, and we come in in a sort of an arbitrary way here, to divide any system or any part of it, into the two functions of transmission and distribution. That has come about from the presentation of the subject. I was asked what is transmission and what is distribution. How are they related? And it is a relationship rather than absolute values.

* * * * * * [*3024*]

PERCY H. THOMAS,

a witness previously sworn, is called in suf-rebuttal on behalf of the Federal Power Commission, and testified as follows:

Direct Examination.

* * * * * * [*3025*]

Q Will you explain the relation of current and energy in the

operation of an electric utility system such as The Connecticut Light and Power Company?

* * * * * *

A The energy in an electric circuit is measured by the instantaneous product of the current and the voltage. As a matter of practical operation, it is found necessary to maintain constant voltage or e. m. f. on lines so that appliances may operate properly. It is generally appreciated that even very slight changes in voltage in a filament lamp greatly affects its efficiency and life. From this it follows that in circuits that current becomes a measure of the energy. Changes in [*3026*] energy are reflected in changes in current, and changes in current are reflected in changes in energy.

I will add that if effective values of current and e.m.f. are involved, instead of instantaneous values the product of the current and the voltage must be multiplied by the power factor to obtain the energy.

* * * * * * [*3029*]

Q Then I will ask whether in your opinion, Dr. Slepian, in his testimony that the tracing of energy flows cannot be verified by physically observed facts, has taken into account all available facts which should be taken into account in order to determine the sources of supplying particular loads where various flows are supplied by various generators through a system of transmission circuits, and ask you if you can answer that with a yes or no answer?

* * * * * *

The Witness: No, he has not.

* * * * * * [*3030*]

Q In your opinion, has Dr. Slepian taken into account facts which a practical engineer does take into account in the design or operation of utility systems?

* * * * * *

The Witness: No.

* * * * * * [*3031*]

Q Will you explain? *A* Dr. Slepian has stated that no facts are observable except the existence of generation measurable by a watt-meter and consumption in appliances, also measurable by watt-meters.

I would point out that Dr. Slepian is ignoring much of what might be called circumstantial evidence, often entirely sufficient to determine energy sources in particular cases.

Q Will you explain what other facts should be taken into account? *A* Except possibly for Dr. Slepian, there is a general agreement here that current supplied to a single load over a single circuit, from a single generator, is known to come from that generator. But when several loads and several generators are connected by transmission circuits, the condition is more complicated, and the source of the individual load current is not so easily determined. Consider the designer of such a system. He knows that each load, say loads located at points A, B and C, for example, must be supplied with two sorts of current. First, work current, [*3032*] sometimes called active or in phase and, second, exciting current, sometimes called out of phase, reactive, or magnetizing current. And he further knows that these currents must be supplied by three generators, say at D, E. and F respectively. The designer then makes up his mind which is the best source for each of these load currents, and tentatively lays out circuits from each of the loads to each of the generators, a circuit for each of his currents. For sake of simplicity, assume currents to load A to be supplied from generator D; currents to load B from generator E; and currents to load C, from generator F. So far, the sources of each such load current—the source of each such load current is not disputed unless it be considered that Dr. Slepian dissents. The designer now examines the situation and finds that some of these circuits can be combined with economy, and in fact that for a por-

tion of the transmission distance, all circuits lie along the same route, and all may be inter-combined into a single transmission line. In that portion of the circuit where before combining, all currents flow side by side, some will be found to flow in one direction and some in the other, and further, some are by hypotheses out of phase. Now, when the several currents flowing side by side are combined into a single current, it will be found that this resultant net, actual, or total current, as it is variously called, [3033] will be much less than the arithmetical sum of all the separate load currents. I will point out that all these terms refer to the same current. According to Dr. Lewis and Dr. Slepian, this resultant is the only current that can be verified by physically observable facts in a transmission line.

Now, it is obvious, as Dr. Slepian has stated, that by merely looking at this resultant current in the transmission circuit, and ignoring all other information, it would not be possible, by the mere examination of this physical transmission line current, to tell where all the component currents come from. I don't think that the contrary has been contended.

What Dr. Slepian has ignored is the evidence of those portions of the system in which the component currents are not all in a common circuit. In many systems, perhaps not all, it is found possible, by the use of this additional or circumstantial evidence, to determine the sources of current even in rather complex systems. There may be some system in which such circumstantial evidence is not sufficient. A trial must be made in each case.

* * * * * * [3037]

Q Will you identify for us the facts which are overlooked, in your opinion, by Dr. Slepian's testimony, or in Dr. Slepian's testimony? *A* I have in mind the fact that by watt-meters and otherwise, it is possible to determine the magnitude and directional flow of many of the component currents which make up the transmission line current, where these currents are flowing in separate

circuits. So that there is no confusion of one by its being mixed with another.

Q Now, can you show what the nature of those facts are in relation to the type of flows that we have under consideration in this case? *A* I can take a case in which energy is flowing over the Agawam lines toward South Meadow substation. In the interest of clearness, I will treat the current as though it progressed slowly from Massachusetts to Connecticut, although it is known that this transfer is practically instantaneous. A slug of current on this line, the amount of which is known from the readings of instruments, reaches the South Meadow outdoor substation, and finally gets into the 66 k.v. bus. There it must follow the bus until some tap is reached. The first tap is at the feeder known as 122, which connects with the 11 k.v. Hartford bus. Meters show that the current in [*3038*] this feeder is flowing toward the 11 k.v. bus from the 66 k.v. bus. I assume, tentatively, that the current in the 122 tap comes from the slug of Massachusetts current. Therefore, I assume tentatively that the balance of the slug follows the 66 k.v. bus further until it reaches the next tap which is feeder 123, similar to feeder 122. Here another portion of the slug is assigned tentatively to feeder 123, because the instruments show that current is flowing in 123 towards the 11 k. v. bus. This leaves a diminished slug of Massachusetts current following the 66 k.v. bus to the next tap, which is a double tap feeding the C.P. 1 and 2 lines. The instruments show that current is flowing out on the C.P. 1 and 2 lines, and I tentatively assign an amount of the remaining slug of Massachusetts current to the C.P. 1 and 2 lines. The residue flows on further in the 66 k.v. bus. The next tap is feeder 124, leading to the 11 k. v. bus, and as this is the only remaining outlet from the 66 k. v. bus, I examine the instruments in feeder 124, and since these indicate that the flow of current is toward the 11 k. v. bus, and is in an amount equal to this residue, I conclude that my tentative assumption as to the flow of current into the various taps is proved correct, and that the source of the current in the C.P. 1 and 2 lines is the Agawam lines.

[3039] I want to emphasize that in tracing this current flow, no reliance has been placed on tagging or identifying units of current by any observation of its characteristics in the place of delivery. In tracing the flow of energy in the C.P. 1 and 2 lines to Massachusetts—I beg your pardon—the Agawam—in the interest of clearness, I have made use of current in place of energy. The same process may be used for energy. The opportunity to use the circumstantial evidence lies open to both.

I would like further to state, in justification of this use of current for tracing flows in systems, that the energy in an electric circuit is measured by the instantaneous product of the current and the voltage. As a matter of practical operation, it is found necessary to maintain constant voltage or e.m.f. on lines so that appliances may operate properly. It is generally appreciated that even very slight changes in voltage in a filament lamp greatly affects its efficiency and life. From this it follows in such circuits that the current becomes a measure of the energy. Changes in energy are reflected in changes in current, and changes in current are reflected in changes in energy.

I will add finally that if effective values of current and e.m.f. are involved, instead of instantaneous values, that the product of the current and the voltage must be multiplied [3040] by the power factor to get the energy.

* * * * * * [3041]

Q In what respect has Dr. Slepian failed to take into account these facts to which you have referred and which, in your opinion, should be taken into account?

Trial Examiner: It doesn't seem to me that your question is clear. Do you mean again what facts he has left out?

Mr. Wahrenbrock: No, I wish to ask the witness to explain.

Trial Examiner: All right. Do you wish to ask the witness to explain what was in Dr. Slepian's mind? If so, it is not proper.

Mr. Wahrenbrock: No, I am asking the witness to explain in

what respect Dr. Slepian's testimony shows that he has omitted to take these facts into account.

Trial Examiner: In other words, what you want to know is what, in Dr. Slepian's testimony, shows that he has omitted the consideration of these facts?

Mr. Wahrenbrock: Yes.

Trial Examiner: The witness can point out that part of the testimony showing the omission. With that understanding, he may answer the question.

[*3042*] *A* When he undertakes to say that no knowledge in these circuits can be had by verifiable observation except as to the total of generation and the total of consumption in a system.

* * * * * *

Q Do I understand then that you are of the opinion that Dr. Slepian has ignored the evidence provided by the separate circuits connecting with the C.P. 1 and the C.P. 2 lines?

* * * * * *

A Yes, that is my view.

* * * * * * * [*3043*]

Q Have you considered Dr. Slepian's views as to the relation of component currents and resultant actual current in the transmission line as stated by him in his testimony? *A* Yes.

Q Do you find his conclusions in that matter with respect to component currents and the resultant actual current susceptible to misconstruction or erroneous application?

* * * * * *

A I have spoken of the system designer as planning his system and seeking out all the separate sorts of current from all the loads that he must provide for, and then when his investigation is complete, combining such as might to his advantage be carried in a single circuit. He passes from the known [*3044*] components to a resultant current.

On the other hand, Dr. Slepian and Dr. Lewis as well must consider the resultant flow existing in an actual completed transmission line when they have occasion to resolve it into components for some purpose or other, possibly to determine from what original component currents the resultant was formed. There is no material difference in the two points of view. Thus is seen one purpose for which this method of flow postulates might be used. Dr. Slepian's and Dr. Lewis's statement are, in effect, that you can set up any fictitious assumption as to what components might have been combined to make the actual flow in the common conductors, and consider it as reasonable as any other, subject only to his criterion of total loads equalling total generation.

* * * * * *

A (Continuing) The critical point made is that whatever set of allocations of load the allocator sets up, that Dr. Slepian carefully states that when the allocator is interested in the physical flow in the transmission line itself, [*3045*] he must not use the fictitious flow components, but must use the total net actual current, to avoid error.

This is in agreement with the statements of my own prior testimony, and with the practice of engineers, but Dr. Slepian's and Dr. Lewis's cautions mean further that these currents into which the net current may be constructively divided and which they say may appear to flow in opposite directions in the circuit at the same time are not the actual physical currents, but merely artificial fictions which they may have found useful for some purpose. Obviously only the actual current can be depended upon to trace electric energy to its actual source, no fictitious components would establish actual counterflow.

* * * * * * [*3046*]

Q In his testimony, Dr. Slepian referred to the phenomenon that when an alternating current flows in a conductor of material dimensions, the current in the center portion lags behind the rest of the current, and that at the time when the current is reversing

in direction, it may still be flowing in the original direction after the balance of the current is reversed, and he has suggested that this may illustrate simultaneous counterflow. In your opinion, does that phenomenon illustrate simultaneous counterflow?

Mr. Branch: I object. I don't think that that is quite an accurate statement of the testimony. Anyway, I would like to have the testimony read on that point, rather than an attempt to paraphrase it.

Mr. Wahrenbrock: Mr. Examiner, I don't think that anyone who reads this testimony is going to rely upon my paraphrasing of Dr. Slepian's testimony, instead of reading the original.

Trial Examiner: Well, I think in view of the fact—

[3047] Mr. Wahrenbrock: I have merely referred to it, I haven't said that was the testimony. I said it was testimony about that.

Trial Examiner: The witness may answer the question. It is Commission counsel's own risk if the question doesn't fit the facts.

Mr. Branch: I object on the grounds I stated.

Trial Examiner: The objection will be noted.

A If Dr. Slepian has considered that this phenomenon is simultaneous counterflow in a conductor in the sense that I have used that term, he is mistaken. He has picked out a well-known characteristic of the flow of alternating current in a conductor of large diameter, found with all flow of alternating current in such conductors and not concerned particularly with the particular flow condition where two generators at the opposite ends of a conductor are trying to cause oppositely directed flow at the same time at the same point in the conductor. Dr. Slepian's lag in the center current flow is an aspect of what is called skin effect in electric conductors. Except for conductors of very large dimensions, it is of no importance. Skin effect receives attention, when it does receive any attention at all, on account of a certain increase in apparent resistence of a conductor that may be observed. In the conductors of the C.P. 1 and C.P. 2 lines, this increase of resistence would be less than about one-tenth of one per cent [3048] in magnitude, but I will repeat, that this mere slight lag of flow

in the center of the conductor behind the rest, has no significance since, broadly speaking, it involves a circuit taken as a whole, merely passing current from a single source to a single load and is not related to counterflow.

My statement as to no simultaneous counterflow was to the effect that when two sources of e.m.f. endeavor to pass current in opposite directions through the same conductor at the same point simultaneously, the result will be an actual resultant current caused by the predominating e.m.f. which will be the resultant of the two currents that would occur were the two sources acting separately in time. This is in accord with the conception of the physical phenomenon of current flow stated by both Dr. Slepian and Dr. Lewis, which regards electric current as the resultant or net movement in one direction, resulting from the heterogeneous motions of free electrons in the conductor.

Obviously there can be only one such resultant or net flow. This is the actual or physically verifiable current. It necessarily follows that there cannot be a simultaneous counterflow of current, because the net flow cannot be in both directions at the same time, and at the same place.

This conclusion has an important bearing on the significance to be attached to the illustrations of counterflow, so-called, by Dr. Slepian and Dr. Lewis, conceived of as occur- [*3049*] ring as a result of opposed components of a resultant current. These include, for example, such groups of components as active and reactive current in a power circuit, exciting and load current in a transformer, and positive phase, negative phase and zero phase potentials in an unbalanced three-phase current.

Naturally, in studying efficiency and capacity and other relations in a power system, in which the engineer has information primarily with regard to the currents and energy in the main portion of the system and very little as to the details of individual consumers, he has occasion, at times, to seek out the effects of some particular aspects of the main currents.

For example, to determine the capacity for synchronous con-

densers, he would desire to know something of the reactive component of the main current. He is of course at liberty to ascertain what total current strength is involved in the reactive component, and he can imagine it to be real if he wants to. As a matter of fact when found in the winding of a synchronous generator or a synchronous condenser away from the transmission line it would be real. However, what he must recognize is that when his reactive component is combined in the transmission line with the load component, the reactive component has entirely lost its identity and that the flow of actual or net current in the line conductors as described by Dr. Slepian and Dr. Lewis, is merely the net drift in one [*3050*] direction of the free electrons. No trace of distinction between active and reactive components remains.

* * * * * * [*3051*]

Q I wish to ask you whether you were present during all of Dr. Slepian and Dr. Lewis's testimony in this case? *A* Yes.

Q And did you hear all of that testimony? *A* Yes.

Q In your opinion, does Exhibit 81-A, which I have shown you, and Dr. Slepian's testimony with respect thereto, show the unreliability of watt-meters if properly used? *A* No.

Q Will you explain your answer? *A* The sketch, Exhibit 81-A shows an obviously improper [*3052*] watt-meter connection, so that the only explanation of the discrepancy he has found that is required is the statement that no watt-meter improperly connected can be expected to show the energy under study. In an electric circuit, or a part of an electric circuit concerning which a knowledge of the quantity of energy flowing is required, the rule for the connections of the watt-meter may be stated that the current flowing into the circuit to be studied shall flow through the current coil of the watt-meter, and the voltage impressed upon that part of the circuit involved in the study in which the watt-meter current is flowing, shall be impressed upon the potential coil of the watt-meter, in order that it shall indicate the appropriate energy flow.

Now, in Exhibit 81-A, the only load is the ohmic resistance, and its amount is 100 watts. The current in the resistance is one ampere flowing in a path through the resistance, through the portion of the transformer winding between the top of the winding and the adjacent terminal, and back to the resistance. The voltage that makes this current flow is that impressed by this top section of the transformer winding, and is 100 volts. All this is as set forth in the diagram and Dr. Slepian's testimony.

If now the current coil of the watt-meter carries this one ampere, and the 100 volts of the circuit of the resistance is impressed on the voltage coil, the watt-meter will indicate [*3053*] 100 watts, which is the true value. Dr. Slepian agreed to this on cross-examination.

As he further testified on cross-examination, Dr. Slepian connected the full transformer voltage of 10,000 volts on the watt-meter potential coil, in making his test, this being 100 times the voltage causing the one ampere to flow. Naturally, the watt-meter reading was 100 times too much. The upshot of this explanation is that the watt-meter gave a ridiculous reading because the method of connecting it in the circuit was ridiculous.

In correction of his defending statement to the effect that he intended to make an overall measurement of the input to the transformer as a whole, with the watt-meter current coil carrying the current in the terminal, and the potential coil impressed with the total e.m.f. of the transformer, I will call his attention to the fact that his connection of the watt-meter does not take into account the third lead, the 9900 volt tap, which is an essential part of this system. The recognition of the effect of the current in this third lead would exactly correct the discrepancy which Dr. Slepian found.

Q In your opinion, is the conception of current flow as stated by Dr. Slepian and Dr. Lewis, in their testimony, inconsistent with the conclusions they have stated as to the mixing of electric currents in a conductor? [*3054*] *A* It seems to me that what Dr. Slepian and what Dr. Lewis have said as to the physical nature

of current flow in a conductor makes inevitable the mixing and commingling of energy in a conductor, as I have already explained. They picture an electric current as consisting of the motion of free electrons in a conductor in a given direction, the electrons as a whole moving in all directions, more or less indiscriminately under the effect of electric forces. These electrons are smaller than atoms and exist in vast numbers. The velocity of their motions is enormous. Considering the movement of these myriad of small bodies, it is obvious as they drift along they must soon be completely mixed and commingled in the wire, especially as in traversing only a few feet of conductor, hundreds of millions of atomic distances are passed. Under the law of probability, the enormous numbers of these high velocity electrons must point to a substantially perfect mixture of all electrons, regardless of any special segregation existing at the point of origin.

Q I call your attention to the testimony of Dr. Lewis relating to certain formulas involving "mutual" inductance of the magnetism, and what he called mutual resistance. In your opinion, does his discussion substantiate his hypothesis that with oppositely directed component currents, the resistance losses cannot be properly calculated as though the components were actual currents?

[*3055*] *A* The discussion both of the magnetic and resistance quantities that he treats relate to the interactions of two currents, tending to flow in opposite directions in the same conductor, in the one case, currents causing magnetic fields, and in the other, currents causing resistance losses. The net result of his mathematical explorations is to show that in order to obtain correct results, magnetism and heating effects respectively, in the conductor, when combining two oppositely directed currents in a single conductor, it is necessary to utilize only the resultant current which is the only physically existing or actual current.

Q There has been testimony in this case as to the electric field and to the magnetic field in the space around conductors, and the movement of energy therein. What in your opinion is the

significance of those fields? *A* The flow of energy in electric circuits is accompanied by e.m.f., or voltage, and current flow. The current is restrained within the conductor by the insulating qualities of the space, or solid material about the conductor. Now, the presence of the electromotive force in the circuit puts a strain, a physical stress on the space about, since this space must resist the electromotive force. This stress—

* * * * * * [*3056*]

The Witness: This stress is naturally accompanied by storage of electric energy in the strained material since the material is elastic. Similarly the current puts a stress on all surrounding materials, tending to magnetize them, and this is accompanied by the storage of magnetic energy in the surrounding space which is elastic to magnetic stress as well as to electric. As the e.m.f. and current are alternating, these stresses are alternating and the energy flows in and out. These actions have little or no relevancy to the flow of energy in the power circuits of electric utilities when the practical trans- [*3057*] mission of electrical energy is in question.

By Mr. Wahrenbrock: *Q* Referring to the testimony of Dr. Slepian with respect to the permissibility, in the case of two circuits entirely separate, as far as metallic connection is concerned, each having a generator and a load, and under his postulate of allocating load to generation in electric circuits, will you state whether, in your opinion, his position is of practical value in the understanding of the actual operation of electric utility systems?

* * * * * *

Mr. Branch: I object. I don't think that that is rebuttal of anything. I don't think that Dr. Slepian said it was. He was asked about a hypothetical question in cross-examination, and I think he made it very clear that he wasn't basing anything on those hypothetical questions which were asked of him on cross examination. As soon as the question was asked, he made [*3058*] it apparent what he was going to get at. He said, "Now you are

talking about a question in the actual world." He didn't base anything on that, and any question here based on the assumption it did, seems to me is irrrelevant.

Trial Examiner: It may be relevant, and I think that the trial examiner is able to determine whether it has any material value. The witness may answer the question.

Mr. Branch: May my objection be noted?

Trial Examiner: The objection will be noted.

* * * * * *

A In my opinion, it is not.

* * * * * * [*3060*]

Q Since June 17th, 1914, have you examined the facilities indicated on Exhibit 80-A which I will show you? *A* Yes.

Q When? *A* On July 24th, 1941.

Q Had you previously examined them? *A* Yes.

Q When was that? *A* During the last week of May, 1941.

Q During the interim, had any of the facilities been removed, or physically changed? *A* From a casual examination I did not find that any part of the facilities had been removed or altered, and I found no switch terminals or leads disconnected.

Q Had any additional facilities been installed in that interim period? *A* Yes.

Q Will you describe briefly those additional facilities and state whether they appeared to be of a permanent or temporary nature? *A* I noticed that a three-wire, 2.4 k. v. circuit had been installed in the outdoor substation, extending from a point which is found at the outer ends of the three current coils in The Connecticut Light and Power Company's circuit [*3061*] leading from the Winsted line transformer to the pothead leads of one of the two three-phase groups of main cables connecting the 2.4 k. v. outdoor bus to the main indoor 2.4 k. v. bus. This three-wire circuit includes a set of three additional oil circuit-breakers, mounted on a temporary wooden base. The three 2.4 k. v. cables and their connections to the circuit were obviously of a temporary nature.

Q Did you notice any differences in the modes of operation of facilities at Torrington in your two examinations? *A* Yes.

Q What were those differences? *A* The system seemed to be in the state that it was during my first visit, except that the added facilities permitted the supply of current directly from the Torrington steam plant to the Winsted transformers of The Connecticut Light and Power Company, without the use of the substation equipment. The Winsted load was being so carried by this steam plant when I was there.

Q Was there anything about the installation of the additional temporary facilities to prevent renewal of the former mode of operation on short notice? *A* No. There was no condition to prevent operation of the facilities in the same manner that they were being operated on my first visit, should the staff so wish to do.

[*3062*] *Q* In your opinion as an engineer, has the character of the facilities by which electric energy was formerly supplied to Winsted from The Connecticut Power Company's lines been changed by the additional facilities and changed mode of operations? *A* As I have stated, no physical change has appeared in the facilities that I observed in May, 1941, and they were still capable, in my last visit, of the same use as on the former; they obviously have not changed as to character.

* * * * * *

Cross-Examination by Mr. BRANCH.

Q Mr. Thomas, did you find on your recent visit, which I think you said was on July 24th, at Torrington, that there was an electrical connection between the C.P. lines and the facilities of The Connecticut Light and Power Company at Torrington? *A* If you mean that the disconnects and oil-breakers were closed, so that the actual conduction of current could occur, I would say "No."

Q The fact is that those were not closed, were they? *A* The switches and disconnects?

Q Yes. *A* No.

[3063] *Q* And you ascertained, did you not, that that was the present normal operating condition? *A* I was in no position to determine that question.

Q Do you mean to say you made no inquiries to find out whether it just happened at the time you went up there that was so, or whether that was now the regular arrangement? *A* It was my impression, and I assume it is so, but I didn't make an investigation directly to justify an affirmative answer to your question.

Q You weren't interested in finding out what the normal situation was? *A* I tell you, my impression was that that was the normal situation. I didn't set myself to prove it.

Q But you say that you were satisfied that the normal method of operation at the present time, and the method which is followed, except in emergency, is for the Torrington steam station to be the sole source of supply to the facilities of The Connecticut Light and Power Company at Torrington and Winsted? *A* Well, with the exception of emergency connections, I expect they expected to get the very great majority of their current and power that way.

Q And you say "the very great majority." The only other source would be Robertsville, wouldn't it? Or was the equipment in the condition in which you saw it when you were [3064] there? *A* No, I stated that it is a question of closing switches to go back to the old operation, getting power from the C.P. Company.

Q But unless that were done, the entire supply would come from Torrington and the Torrington steam plant and the Robertsville plant? *A* As long as these switches connecting to the C.P. lines were open.

Q Yes. Now, Mr. Thomas, is it not true that there is often a large current flow of reactive volt amperes in one direction simultaneous with an energy flow in the other direction, in conductors? *A* I think I have made my position pretty clear on that. Have you some new point in view in asking that question?

Q I wish you would answer my questions, instead of trying to probe my mind.

* * * * * *

A I will say No, but it may answer the intent of your [*3065*] inquiry if I point out that it may be that true power, active power, may be sent from one end of a line to the other, and reactive power sent from the second and to the first, and each reaches its destination, but the flow in the line between will be a resultant flow and not a double flow of energy. In making that statement I have to assume that this result is accomplished by the generator at the power end being able to short-circuit from the line to the load at its end, speaking in instantaneous values.

By Mr. Branch: *Q* Well, doesn't that situation obtain in the synchronous condenser, frequently?

Mr. Wahrenbrock: I don't understand the reference to that situation, Mr. Examiner.

Trial Examiner: I think it is a situation which has just been stated in the last answer of the witness. I think that may well be understood.

Mr. Branch: Yes, sir.

Mr. Wahrenbrock: Well, I don't identify a situation which has been stated.

Trial Examiner: The witness has stated a certain circumstance of flow under certain conditions.

The Witness: I have stated that synchronous condensers and generators can contribute to a system each its own type of energy, and the result is accomplished by a single line, [*3066*] but that that does not involve reactive energy and active energy passing in opposite directions over the line.

By Mr. Branch: *Q* When each supplied the other with what it does supply simultaneously? *A* I had in mind an instant of time, what you might call simultaneous operation.

Q Then the answer to my question is "Yes," isn't it? *A* It depends on what your question means. The difference hinges on

whether you recognize a resultant current as accomplishing these two results or whether you wish me to visualize two actual currents passing in opposite directions in the same line at the same time.

Q Well, isn't what you are talking about just a convention? *A* If you mean the considering that the active and reactive currents flow simultaneously in opposite directions, that would have to be a convention, it wouldn't be a fact.

Q How do you know that it is just one current? *A* Well, its heating effects would be one method of judging that. It is, I should say, obvious to an engineer that physically that is the only thing that could exist, according to any practical working theory we have, but the fact that the heating effect produced checks with the single current is one positive evidence.

[*3067*] *Q* Well then, do I understand that you do deny the possibility that reactive volt amperes may flow in one direction, while active energy flows in another direction in a conductor? *A* I deny that in my opinion two physically independent currents can flow or that currents of energy could so flow simultaneously in opposite directions in the same conductor.

Q Do you regard the flow of reactive volt amperes as a flow of current? *A* I have explained that under certain circumstances, as where we have a constant potential impressed upon a system, that it is convenient to picture the flow of current which is more easily pictured and recognized and that we are able to infer for many purposes the result that we would get if we were using energy for the same purpose.

Q Will you please answer my question? *A* I thought I did.

Q Either yes or no. Do you regard a flow of reactive volt amperes as a flow of current?

Mr. Wahrenbrock: Mr. Examiner, I object to an instruction to answer yes or no, unless it can properly so be answered in the witness's opinion.

Trial Examiner: If the witness can answer yes or no, he can say so. That is very common, to use that expression of instruction

to a witness, and it is not at all improper, if the witness can so answer.

[*3068*] *A* No.

Q What do you regard it as? *A* You are equating a current to a k. v. a. They are different characters. One is energy or apparent energy and the other is current. There is no relation between them.

Q Well, what are reactive volt amperes? *A* If you excited a magnet with alternating current and multiplied the voltage by the current, you would get reactive kilovolt amperes, if you measured it with kilovolts, provided there were no losses in the system.

Q Would it not be possible, for instance, that reactive volt amperes were being supplied to a synchronous condenser, for instance, from a generator at one end of the system and the active energy from the other end of the system? *A* It is true that a system can be supplied at one end with reactive k. v. a. and from the other by active k.v.a.

Q And you do not deny, do you, that even at times, when using the wattmeter readings, as you have used them, the indications would be that the flow was in to Hartford from the South Meadow substation, the reactive volt amperes would be flowing in the other direction from Hartford? *A* The instrument would not indicate that.

Q Do you deny the possibility? *A* That they do indicate that there are two currents or two flows of energy in opposite directions at the same time? [*3069*] Yes.

Q I am not attempting to pin you down. I am trying to be definite and not pin you down as to whether it is energy or what. I am talking about reactive volt amperes, call it what you will. Do you deny that it is possible that reactive volt amperes could flow from Hartford to the C.P. line at the same time that the watt-hour meter readings indicate to your mind that all of the flow on those lines going into the transformers at Hartford was in the opposite direction? *A* I can't get clearly the meaning of your question. I can restate my view of that situation.

Q No, I don't want you to restate your view. *A* Well, if you will please restate your question.

Q As I understand, you believe that a certain reading of watt-hour meters will convince you that the flow of active energy on those lines go to the transformers near the 11 k. v. bus at Hartford, toward that 11 k. v. bus. I am correct in that assumption, am I not? *A* May I hear that again? I want to be very sure I have got just exactly what you have said.

* * * * * * [3070]

The Witness: Well, this has gone so far I don't understand the picture of the situation. You have left so much to be inferred, I have lost the particulars of the circuit that you are talking about.

By Mr. Branch: *Q* Isn't the whole basis of your conclusion in regard to the correctness of Mr. Miller's energy flow your premise that the watt-hour meter readings as integrated will show that energy is flowing in a single direction, in the line which goes from the 66 kilowatt line to the 11 k.v. bus in Hartford? A Yes.

Q Well, then, you understand what I mean in saying that the watt-hour meters indicate to you that the electric energy is all flowing in that direction, in that line between the 66 k.v. bus and the 11 k.v. bus? *A* You mean 122 or 123?

Q Yes. *A* Yes.

Q And to your mind, some watt-hour meter readings will indicate that all of the flow on that line is in a single direction, we will say, toward Hartford?

Mr. Wahrenbrock: Mr. Examiner, the questions constantly assume a single line, whereas all the evidence shows there are three feeders, 122, 123 and 124, between the points.

Trial Examiner: I don't think the question goes into [3071] the matter of how many lines there are. I think he is talking about the situation that existed at one time on one of the lines.

Mr. Branch: That is correct, sir. I think every one understands.

Mr. Wahrenbrock: Well, the evidence very clearly shows that

there are totalizing meters, and you have to consider all three lines. Now, what is the purpose of asking about separate lines when the only evidence in the case is with reference to all three lines.

The Witness: May I answer?

Trial Examiner: You may answer the question.

The Witness: The watt-meter, of course, indicates the watts passing in the line in which it is measuring the current.

By Mr. Branch: *Q* And to your mind, that, possibly in connection with other meter readings, would indicate that there was energy flowing only in that direction, in one particular line. Am I correct in that? *A* That is what the instrument shows. The watt-meter shows current flowing in only one direction.

* * * * * *

Q Is it not possible that at the same time the watt- [3072] meter showed that situation on that line, reactive volt amperes might not be flowing in that same conductor in the opposite direction? *A* I will answer that no, and explain what I have in mind by saying that, that when the situation which you set up occurs the fact that there is a tendency for these two energies to flow at the same time results in a resultant flow, which is different from either of the others, but takes care of the thing that is accomplished. The two amperes of reactive components do not flow as entities at the same time in the same wire. They produce a resultant which accomplishes the purpose which was set up, which led to the readings which you speak of.

Q Well, you are familiar with the meters in the South Meadow substation, are you not? *A* Yes.

Q And there is a meter there which does purport to show the direction in which the reactive volt amperes are flowing. That is so, isn't it? *A* That is right.

Q And is it not true that at a time when the watt-hour meter would show the energy flowing in one way, on one of those lines, the meter measuring or showing the direction of flow of the reactive volt amperes would show a flow in the other direction?

A Well, they do flow as components. There is this [*3073*] opposite flow as components. But the net result is a resultant flow in one direction.

Q But my point is one meter does not show one thing in one direction, and at the same time the other meter shows a flow of something else in the opposite direction? *A* It shows a flow of components in one direction at the same time it shows a component flowing in the opposite direction, but neither one represents the actual flow.

Q Now, you have given an illustration which I think you said satisfied your mind as to the correctness of some of your conclusions, in which you took—I have forgotten whether you called it "hunks" of current coming down— *A* A slug.

Q All right. Is that a scientific engineering term? *A* Well, among practical engineers, I think it is.

Q All right. You conceive of a slug of current coming down the Hartford-Agawam line, and you get little slugs being chipped off from it on the way down, is that the conception? *A* Yes.

Q And finally, when you get some of them safely by South Meadow, you find them going out into the C.P. lines 1 and 2, is that correct? *A* That would be a practical engineer's way of expressing it, yes.

Q Now, would the sum of the little slugs, or the chips [*3074*] of the block, all equal the big block that you started off with across the State line? *A* Yes.

Q As a matter of fact, from those readings, how is current measured? *A* I made an illustrative example, and I told you I used current as more easily followed than energy. The measurements there that have been reported have been energy measurements. The same line of reasoning would lead to the same result, using energy as flowing instead of current as flowing.

* * * * * *

Q How is current measured? *A* Ordinarily, with an ammeter.

Q Do you mean to say that the ammeter readings all along the line at different points where you have visualized the little slugs as coming off the big slug, would be equal to the reading which was taken, we will say, at Agawam or some place north? [*3075*] *A* That was my thought.

Q You state it was your thought. Don't you know as a practical matter that very often that is not the case? *A* No; I don't know what you have in mind, but I certainly wouldn't agree to that.

Q Does an ammeter indicate direction of flow? *A* A direct current ammeter does. An alternating current ammeter, taken by itself, does not.

Q Then, any readings that you might make from ammeters in this system, which I think it is agreed has an alternating current, would not indicate the direction of flow of those little slugs, would they? *A* I didn't state that I had made a measurement. I was making an illustration, and showing what would happen when you investigated and found out what the currents were.

Q Well, I must have misunderstood you. I thought you stated that you proved something from some kind of observation of meters, or ammeters, that indicated current flow at various points along the line. Is that not true? *A* I assumed that those currents could be so measured, because my illustration didn't involve the question of how those values would be determined. If you want to know how they could be determined, the power factor and nature of instruments, ammeters and all the other things that might be mixed up in that, I will do my best to help you out. But that is [*3076*] another story.

Q You don't mean to convey the impression then that you have conducted any experiment by actual reading of meters along the line in connection with these slugs of current that bear out your contention, do you? *A* No. My answer was not based on any experiments.

Q You are giving a purely theoretical example, based on certain assumptions, weren't you? *A* Well, I would say it was a

practical engineer's view of it. It was based on assumptions, certainly.

Q Yes. Now, did you understand that Dr. Slepian did not, in reaching his conclusion, give any consideration at all to readings on watt-meters? *A* No. I think I stated that he said the summation of all the watt-meter readings of generation would be the equal of the sum of all the watt-meter readings of loads, considering losses as loads.

Q Did you understand he did not give whatever weight he felt should be attached to all meter readings, or could be placed on watt-hour meters and watt-meters? *A* I didn't intend to intimate that he distrusted the use that is made of meters per se, as a meter, except as he characterized a watt-meter as showing the average for a short time of the watts, instead of the exact value at the instant.

Q Well, you have been here during all the testimony of [*3077*] Dr. Slepian and Dr. Lewis, have you not? *A* That is right.

* * * * * * [*3078*]

Q Didn't you understand both Mr. Lewis and Dr. Slepian to testify that in their opinion it was impossible to demonstrate that there could not be simultaneously counter flow of energy at the same point? *A* I believe they both made that claim.

Q Well, you say you believe that they made it. Are you in any doubt about that? *A* Well, the testimony so indicated. I wasn't going into their minds.

Q You say their testimony so indicated. What do you mean? *A* They made that claim, yes.

* * * * * *

Q Were you present when I asked this question of Dr. Lewis, which appears on page 2314 of the transcript:

> "Would any study based on the information which could be obtained from that log sheet of January 15th, relating to

the first nine hours of the morning, based also on the readings of any other watt meters or watt-hour meters, together with knowledge of the method of operations shown thereon during that time, together with knowledge of ..cation of the meters and [*3079*] the readings made from them, conclusively show that the load at The Connecticut Light and Power Company at Bristol were served exclusively during those hours with energy generated outside of Connecticut, as for example, in Massachusetts, in your opinion?"

Do you recall that question? *A* That sounds very familiar.

Q Well, you recall that Mr. Lewis answered that question, "No"? *A* Yes, I so recall.

Q So it is obvious in regard to Dr. Lewis at least, he was asked to give whatever consideration he felt was proper to the reading of watt-meters and watt-hour meters, was it not? *A* He was asked, I think.

Q Yes. Do you mean—you say he was asked that. Do you mean to state you feel his testimony was not based upon what he felt was proper consideration of readings of watt meters, watt-hour meters?

Mr. Wahrenbrock: That goes into the subjective processes of Dr. Lewis's mind, which I think is not proper cross-examination.

Mr. Branch: I am a little surprised at the nature of this objection, Mr. Examiner, because I think your Honor made it clear when we were discussing the form of questions that should be asked, that the question was what Mr. Lewis testified to, [*3080*] as to his reasons as shown. Now, this witness has given what to me was some indication he felt Dr. Lewis didn't consider these matters, and I think I have a right to bring out that the examination distinctly called these matters to Dr. Lewis's attention, and I am asking him whether in spite of that, his contention is that Dr. Lewis didn't give them consideration.

Trial Examiner: The witness may answer the question.

The Witness: I have lost the question.

Trial Examiner: Read the question back for the benefit of the witness.

(Whereupon the last question as above recorded, was read by the reporter.)

The Witness: He may have considered them proper. I don't know about that.

By Mr. Branch: *Q* Well, I am not sure whether your contention is that he didn't give any consideration to those matters, or whether you just feel that you differ from him as to the interpretation that should be put upon them. *A* I guess it is safe to conclude that I differ.

Q On the interpretation? *A* On the interpretation to be put on that situation, yes.

Q My recollecion of your testimony this morning, sir, is that it included something substantially like this: That [*3081*] you felt that Dr. Slepian omitted the fact that a watt hour meter can show direction of flow of current in a separate circuit, with not more than one source of supply. Does that question indicate to you the testimony to which I refer? *A* I think it does.

Q And will you state, in order that I may not misrepresent you, just what your testimony was in that respect? I mean, in substance. *A* What I had in mind was this, that if, as Dr. Slepian once said, generation in one circuit could be allocated to load in another, that is the denial of the fact that load in the same circuit with generation must come from that generation.

Q Did you not realize that the answers which Dr. Slepian gave in respect to that matter were all theoretical examples which he said could not occur in practice? *A* Well, I agree they couldn't occur in practice, some of them, but just what you mean by "theoretical," I am not sure.

Q Those were all questions which Mr. Wahrenbrock asked on cross-examination, were they not? *A* When you say they were all, I don't know. There were a lot of questions on that matter by Mr. Wahrenbrock.

Q The questions relating to this matter to which we are re-

ferring. *A* If you are talking about the allocation of load out [*3082*] of one circuit on to generation of another, that is true.

* * * * * * [*3083*]

Q Now, as I recall it, you said that you felt that Dr. Slepian failed to give proper regard to certain things which you characterized as "circumstantial evidence." Is that substantially a correct statement?

* * * * * *

The Witness: I referred to it as circumstantial more particularly in view of Dr. Slepian trying to distinguish what [*3084*] was real evidence in the watt meters and what I considered was conclusive indirect proof, going back to the circuits beyond the transmission line, where the different components of currents of the transmission line are in separate circuits.

By Mr. Branch: *Q* Dr. Slepian didn't use the word "circumstantial evidence," did he? *A* No, I applied that as the natural description of his attitude in the matter. He would not accept circumstantial evidence.

Mr. Wahrenbrock: May the witness complete his answer?

Trial Examiner: I think the witness may complete his answer.

The Witness: That finishes it.

By Mr. Branch: *Q* In other words, you make use of what you designate as circumstantial evidence in order to reach your conclusions, do you not? *A* No. I used that word only to indicate a class of evidence outside the transmission conductor, where we have the resultant current, because Dr. Slepian very carefully stated what he considered to be directly observable evidence, and if this other evidence did not constitute directly observable evidence, then I characterized it as "circumstantial" as a convenient term to distinguish what he wouldn't admit as [*3085*] evidence, but what seems to me sufficient proof of flow in certain cases.

Q Did not you yourself characterize the evidence which you felt had been neglected by Dr. Slepian, and on which you relied, as "circumstantial evidence"?

Mr. Wahrenbrock: Mr. Examiner, the question has been asked and answered once or twice before.

Trial Examiner: I think the question may be answered.

The Witness: I introduced the word "circumstantial," but introduced it in illustration of what I would suppose he might term, that he might have used in describing such evidence as that.

By Mr. Branch: *Q* In your direct testimony, you did not indicate, did you that you used the word "circumstantial," because of what you thought Dr. Slepian might characterize it as? *A* I think I did. I used the expression according to Dr. Slepian's point of view, as I remember.

Q Well, according to your point of view, is it circumstantial evidence? *A* No. I don't see why it isn't direct evidence, the same as the other watt-meter readings.

Q You said watt-meter readings do give correct results if they are used properly? *A* Yes.

[*3086*] *Q* And they may give incorrect results if they are used improperly? *A* That is right.

Q And it is no part of the function of the watt-meter at South Meadow station to determine the source of the energy which goes to a particular load, is it?

* * * * * *

The Witness: The watt-meter merely indicates the watts passing in the circuit at the point where the connections are made.

By Mr. Branch: *Q* And it is not intended to indicate the source or the destination of the energy, is it? *A* It is not intended. The watt-meter readings, per se, do not show that. I don't know what you mean by "intended."

Q Well, the purpose of the watt meter is not to enable any one to trace energy from its source to the load where there [*3087*] are several loads and several sources of generation? *A* It might well be. I haven't any particular case in mind. It might well be that purpose.

Q But that isn't the purpose at South Meadow, is it? *A* I presume they put that there to indicate the flow for all purposes, or for any purpose that anyone might have who wanted to read it.

Q But as you understand the arrangements with the customers, such as The Connecticut Light and Power Company, nothing depends upon the source, nothing in their billing depends upon the source from which the energy comes, does it? *A* I haven't looked into their billing.

Trial Examiner: I don't think there is any evidence that this witness is sufficiently familiar with the operating conditions of the plant to know what the purpose was of their placing it there originally.

By Mr. Branch: You have no reason to believe that those watt meters, or watt-hour meters, were placed there for the purpose of enabling anyone to determine from what source energy was supplied to the load at Bristol, for instance?

Mr. Wahrenbrock: Mr. Examiner, I object to that question as not material, what they were placed there for, if they are properly used for the purpose for which they have been used in this testimony, or the testimony supported by this witness's [*3088*] testimony.

Trial Examiner: We will permit the witness to answer the question.

The Witness: I presume they were put there to obtain the indications of the flow for any purpose that anybody wanted to use it for. Of course, I don't know why they were put there. I wasn't there. I don't really know anything about it.

By Mr. Branch: *Q* All right. Now, isn't the basis of the whole disagreement between you, on the one hand, and Dr. Slepian and Dr. Lewis on the other, your contention that there cannot be simultaneously counter flow of energy at the same point, and their contention that there is no proof that that may not be so? *A* Well, that is one difference of opinion. I wouldn't say that was all.

Q If you took their point of view on that, you could not support the power flow diagrams and conclusions of Mr. Miller, as expressed in his exhibit which is No. 62, could you?

Mr. Wahrenbrock: I object to that question as requiring the witness to assume assumptions, or to make assumptions entirely in contradiction with all of his testimony and therefore it is an improper question.

Mr. Branch: I don't think it is improper at all. I think we have a reason for seeing the basis for disagreement.

[3089] Trial Examiner: I think the question is in order.

* * * * * *

The Witness: Well, that conception of theirs is so impossible to my mind, that what the effect of trying to imagine would be, I can't tell. That is, just what would happen if you could have two things going in opposite directions at the same place and the same time, I don't know what the effect of that would be.

Q Didn't you state in your direct testimony when you were called originally that one of the fundamental principles upon which Mr. Miller's conclusions would be supported was that there could be no simultaneous counter flow of energy at a single point? *A* I so understood.

Q Yes. And the whole basis of Mr. Miller's conclusions and your support of those conclusions would fall if that principle doesn't stand. Isn't that correct? *A* No. You asked me that question once before. If that principle didn't stand, you have to have a fresh examination of the situation and see what would happen.

Q But as far as anything that has been done in this case, as far as you know, that is an essential premise for [3090] the conclusions reached by Mr. Miller, is it not? *A* I will say he depended upon it. I wouldn't say that the lack of it would vitiate the results, but he did depend on it. That was one bridge he used.

Q He did depend on it? *A* I say he used it as a bridge.

Q And you supported it by stating that it was a principle which was a bridge? *A* I believe that it was a good strong bridge.

Q Now, have you ever conducted any experiments to determine whether there could be counter flow of energy simultaneously at a given point? *A* I never went into the laboratory and set up an experiment to prove that as a laboratory demonstration, no.

EXHIBITS.

* * * * * * [*3126*]

EXHIBIT 8.

This contract supercedes Cont No. 4336 ARB 1/13/37 No. 5788

This Agreement made this 16th day of December 1936, by and between The Connecticut Power Company, hereinafter called the Seller, and The Connecticut Light and Power Company, hereinafter called the Buyer, both being corporations organized and existing by virtue of the laws of the State of Connecticut.

Witnesseth:

Whereas, the Seller is supplying electric power to the Buyer at Bristol. Connecticut under an agreement dated as of November 1, 1930, and

Whereas, the Seller and the Buyer desire to terminate said agreement and enter into a new agreement relative to the supply of electric power at such point,

Now, Therefore, in consideration of the premises and of the mutual covenants and agreements herein contained the parties hereto covenant and agree with each other as follows:

Article I

It is mutually agreed that the said agreement between the Seller and the Buyer dated as of the first day of November 1930 shall terminate on December 31, 1936.

Article II

Commencing January 1, 1937 the Seller agrees to supply and the Buyer agrees to take and pay for electric power under the terms and conditions as hereinafter set forth.

[*3127*] Article III

The Buyer shall take from the Seller the Buyer's entire requirements of electric power for its Bristol District and the Seller agrees to supply the same. Said electric power shall be in the

form of 3 phase 60 cycle alternating current and shall be delivered and measured at approximately 66,000 volts by suitable metering equipment furnished and installed by the Buyer at the substation of the Buyer in the city of Bristol.

The Seller shall furnish to the Buyer a quality of service, including voltage regulation, frequency and freedom from interruptions, which shall compare favorably with similar service furnished elsewhere by other companies where accepted good practice prevails.

The power factor shall be governed by day to day operating understandings between the Seller and the Buyer and in case of failure to agree the Buyer shall maintain for such reasonable load period or periods as the Seller may from time to time request a power factor of not less than 80% lagging.

Article IV

The price to be paid by the Buyer to the Seller for electric power supplied hereunder shall consist of a demand charge of $1.50 per month per kilowatt of demand and an energy charge of four mills per kilowatt hour for all current delivered plus the sum of $2,000.00 per month, which sum shall be subject to review and adjustment by mutual agreement between the Seller and the Buyer at any time.

[*3128*] Said energy charge is based on the cost to the Seller of fuel equivalent to coal meeting the following specifications

Volatile matter		15 to 23%
Ash		3 to 5%
Sulphur	not to exceed	1.5%
Fixed carbon		71 to 79%
Btu's	about	14,700 per lb

and costing $5.30 per net ton delivered in the bunkers of The Hartford Electric Light Company's power stations at Hartford. Should the cost of fuel on such basis be more than $5.55 or less than $5.05 per net ton, then for each one cent increase above $5.55 or decrease below $5.05 the energy charge shall be in-

creased or decreased respectively by seven ten-thousandths of a cent per kilowatt hour. The average cost of fuel used during the period of any three consecutive months shall determine the amount of such increase or decrease in the energy charge for the next succeeding month.

The method of determining the demand shall be by demand meter, the interval being thirty minutes, and the demand for billing purposes shall be the highest single thirty minute demand as registered by said meter during the last elapsed twelve months.

The price for electric power as set forth herein is based upon the present level of taxation as imposed by existing tax laws insofar as such taxation affects the cost of producing and delivering the electric power covered by this agreement. In the event of substantial variation from such level or in the event of the imposition of any tax clearly earmarked as applicable to the electric power covered by this agreement, such as a gross earnings tax or a sales tax, then said price shall be [*3129*] subject to review and adjustment by mutual agreement in the light of such variation. In case of disagreement as to any such adjustment the matter shall be referred for decision to an arbitrator to be selected by the parties hereto and if they cannot agree upon an arbitrator either party may call upon the Chairman of the Public Utilities Commission to select an arbitrator.

Bills shall be rendered on or about the first day of each month for electric power supplied during the previous month and shall be paid on or before the 15th day of such month.

Article V

The Buyer shall have the right to purchase from the Seller and the Seller agrees to sell to the Buyer, within ninety days after the termination of this agreement, the Seller's tap line from Bristol Junction to the Buyer's Bristol Substation, including the right of way for said tap line and a right of way across the Seller's lines and right of way at Bristol Junction.

The price to be paid for said tap line and rights of way shall be Sixty-two Thousand One Hundred Twenty-five Dollars ($62,-

125.00) plus the cost of additions and betterments made to said tap line and right of way for same subsequent to November 1, 1930, less depreciation at the rate of Eight Hundred Six Dollars and Ninety Cents ($806.90) per year for the period from November 1, 1930 to the date of such purchase.

[*3130*] Article VI

The term of this agreement shall extend until January 1, 1947 and thereafter until the expiration of two years' written notice from one party to the other, which said notice may be given at any time after December 31, 1944.

Article VII

It is mutually understood and agreed that this agreement succeeds and takes the place of all prior agreements, promises or understandings, expressed or implied, relating to the supply of electric power by the Seller to the Buyer at Bristol.

Article VIII

The successors and assigns to the parties hereto shall be entitled to the rights and benefits of and shall be bound by this agreement; but no assignment of the rights of either party shall be valid without the consent in writing of the other. A consolidation or merger of either party with another corporation or the placing of a general mortgage by either party upon its property shall not be construed as an assignment within the meaning of this Article.

In Witness Whereof, the Seller and the Buyer have caused this agreement to be executed in duplicate by their proper officers thereto duly authorized and their respective corporate seals to be hereto affixed the day and year first above written.

THE CONNECTICUT POWER COMPANY

By V E Bird President

Attest R R Dana Secretary

[*3131*] THE CONNECTICUT LIGHT AND POWER COMPANY

By Irvin W Day Vice President

Attest P R Fleming Secretary

STATE OF CONNECTICUT
COUNTY OF HARTFORD ss

Hartford, December 16th 1936

Personally appeared V. E. Bird, President of The Connecticut Power Company signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of The Connecticut Power Company, before me.

EDNA L. NEUMANN
Notary Public

STATE OF CONNECTICUT
COUNTY OF NEW HAVEN ss

Waterbury, December 16 1936

Personally appeared Irvin W. Day, Vice President of The Connecticut Light and Power Company signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of The Connecticut Light and Power Company, before me.

KATHARINE R. STARBUCK
Notary Public

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* * * * * * [3133]

EXHIBIT 10.

THE CONNECTICUT POWER COMPANY
31 Union Street New London, Conn.

January 4, 1940

The Connecticut Light and Power Company, 36 Pearl Street, Hartford, Connecticut.

Gentlemen:

In accordance with your request of January 2nd 1940, we will bill you for power supplied to you at Bristol under the agreement dated December 16th 1936 on the basis of $1.50 per month per kilowatt of demand, plus an energy charge of five mills per kilowatt-hour for all energy delivered, said billing to commence as of January 1st 1940.

It is understood that the first paragraph of Article IV of said

agreement shall be deemed to be amended to conform to this price, and that the additional adjusted payment of $2,000.00 per month, as set out in said paragraph, is hereby eliminated.
Will you please endorse one copy of this letter and return the same for our file?

Yours very truly,
THE CONNECTICUT POWER COMPANY,
A. D. Colvin, Executive Vice President.

Approved and Accepted this day of January 1940.
THE CONNECTICUT LIGHT AND POWER COMPANY,
By R. T. Knowlton.

[*3134*]

EXHIBIT 11.

POWER SUPPLY CONTRACT

No. 3988A-2

August

This Agreement made this 11th day of July, 1930, by and between The Torrington Electric Light Company (hereinafter called the Torrington Company) and The Connecticut Light and Power Company (hereinafter called the Light Company) both being corporations duly chartered by the State of Connecticut, and having their principal places of business in Torrington and Hartford in said State respectively

Witnesseth:

Whereas the Torrington Company and the Light Company entered into a power supply contract dated August 14, 1929, and

Whereas by reason of certain changes now being made in the transmission facilities over which said power supply is transmitted the Torrington Company and the Light Company desire to enter into a new power supply contract to be substituted for and take the place of said contract of August 14, 1929.

Now Therefore, in consideration of the mutuality hereof and the benefits to each party hereto, the said Torrington Company and the said Light Company hereby covenant and agree by and between themselves as follows:

1. The sale and interchange of electric power hereunder shall

be accomplished over the transmission facilities operated by the Light Company under the terms of a separate agreement of even date herewith between the parties hereto to be known as the "Transmission Line Agreement" to which reference is hereby made.

[*3135*] 2. The Light Company agrees to transmit and sell to the Torrington Company and the Torrington Company agrees to take and pay for such surplus electric power as the Light Company has available from the Robertsville Plant of The Winsted Gas Company, if, as and when the Torrington Company can use it.

3. For said surplus electric power the Torrington Company shall pay the Light Company at the rate of eight and one-half mills per kilowatt hour.

4. Said surplus electric power shall be metered and delivered to the Torrington Company at 2300 volts on the step-down side of the Light Company's transformers at the Franklin Street station of the Torrington Company. The Light Company having the facilities will at its own expense test and calibrate the various meters required hereunder. The details of carrying this out to be arranged at the mutual convenience of the parties hereto.

5. The Torrington Company shall sell and the Light Company shall take and pay for firm electric power for delivery to The Winsted Gas Company under the following terms and conditions.

6. It is understood and agreed that the Torrington Company obtains its electric power in whole or in part either from its own steam plant or from The Connecticut Power Company and the supply of firm power for ultimate delivery to The Winsted Gas Company shall be subject to the circumstances, terms and conditions under which the Torrington Company obtains such electric power from The Connecticut Power Company to the extent that the said circumstances, terms and conditions affect the supply destined for The Winsted Gas Company.

[*3136*] 7. Any electric power furnished by the Torrington Company to the Light Company destined for The Winsted Gas Company hereunder shall be construed, for the purpose of fixing the

terms of payment therefor, as having been obtained from The Connecticut Power Company and be sold and metered at 2,300 volts at the Franklin Street station of the Torrington Company, but the Torrington Company may at its own option furnish it in whole or in part from its own steam plant.

8. The price to be paid by the Light Company to the Torrington Company for electric power furnished hereunder shall be based upon the same rate schedule as paid by the Torrington Company to The Connecticut Power Company, as evidenced by the monthly bills from The Connecticut Power Company to the Torrington Company, plus ten percent. The demand of the Light Company for billing purposes shall be its demand at the time of establishment of the billing demand of the Torrington Company. This price may be revised at the end of the first year of this contract at the request of either party hereto.

9. The parties hereto agree to give each other every reasonable aid, assistance and co-operation in regard to the rate, terms, conditions and quality of service of the power supply from the Connecticut Power Company to the Torrington Company, recognizing that both are mutually interested.

10. The parties hereto agree to confer with respect to the increases in capacity required from time to time by the Light Company for supply to The Winsted Gas Company and The Torrington Company agrees to give such [*3137*] notices and take such steps as may be necessary to obtain from The Connecticut Power Company such increases in capacity as may be necessary to meet the load requirements of the Light Company hereunder, provided, however, that the Torrington Company, having in good faith taken the proper steps and performed its part in an effort to obtain satisfactory, adequate and sufficient electric power supply including the requirements of the Light Company hereunder, shall not be responsible to the Light Company for any act of omission or commission on the part of The Connecticut Power Company with respect to said electric power supply.

11. Bills for payments required hereunder shall be rendered monthly and paid within ten days thereafter.

12. If at any time the Light Company shall make a connection between its own transmission system and The Winsted Gas Company direct or through the transmission line which is the subject of the said "Transmission Line Agreement" it may on one year's written notice to The Torrington Company cease taking electric power hereunder.

13. This contract shall take effect as soon as the changes hereinabove referred to in transmission facilities are completed and ready for service, and, unless terminated as in the preceding paragraph provided, this contract shall continue in force until June 1, 1944.

14. Neither party hereto shall assign or otherwise dispose of this agreement or any of its rights or interests hereunder without the written consent of the other party; provided, however, that nothing herein contained shall prevent or limit the right of either party to make a [*3138*] general mortgage in the usual form on any or all of its property, rights, privileges and franchises or to enter into any merger or consolidation, and, in the case of the foreclosure of such mortgage or in case of such merger or consolidation, its rights and obligations hereunder shall pass to and be acquired and assumed by the purchaser or foreclosing mortgagee or the merged or consolidated company, as the case may be.

15. As soon as this contract goes into effect as in paragraph 13 hereof provided, the said power supply contract between the Torrington Company and the Light Company dated August 14, 1929 shall cease and determine.

16. To carry out the purposes of this agreement the Light Company may erect, operate and maintain transformers, switches and other related equipment at the Franklin Street station of the Torrington Company, and the Light Company shall assume all liability for accidents or damages which may be the result of such operation and maintenance of its said apparatus.

In Witness Whereof the parties hereto have caused this agreement to be executed in their name and their corporate seals to be

affixed hereto by officers duly authorized the day and year first above mentioned.

THE TORRINGTON ELECTRIC LIGHT COMPANY
By T M Ulman President

Attest: H. B. Fuessenich, Secretary

THE CONNECTICUT LIGHT AND POWER COMPANY
By Irvin W. Day, Vice President

Attest: W. L. Campbell Secretary.

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* * * * * * [3394]

EXHIBIT 16.

[Stamped:
Federal Power Commission Docketed
Aug 3 1940
Docket Section Secretary's Office JRS
Federal Power Commission
Received Aug. 3 1940]

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION
Docket No. IT-5645
Fishers Island Farms, Inc.

Application of Fishers Island Farms, Inc., for approval and authorization under Section 203, Part II of the Federal Power Act, for the sale of certain facilities to The Fishers Island Electric Corporation.

To The Federal Power Commission.

* * * * * * [3396]

The applicant maintained the necessary equipment, transmission and distribution lines to render service to the residents of Fishers Island as an incident to its real estate development. In 1925, the applicant sold all of the undeveloped land and electric distribution facilities located on the east end of Fishers Island to the Fishers Island Corporation, which was primarily a real estate

development corporation. The applicant continued rendering service, regardless of whether the customer was located on the east end or the west end. The applicant owns two submarine electric cables connecting the Island with the mainland at Groton, Connecticut. The applicant purchases electric power from the Borough of Groton, Connecticut, and by means of the submarine cables transmits the electric energy to Fishers Island where it is distributed to approximately 321 customers. Most of these customers are on the west end of the Island. The requirements of customers for electricity is three times greater in August than in December. The total gross receipts for a year from the electric business are about $64,000.

* * * * * * [*3400*]

After the transfer of the electric utility assets owned by the Fishers Island Farms, Inc., and the Fishers Island Corporation, to The Fishers Island Electric Corporation, a public utility company with a public franchise, such Corporation will carry on the electric business on the whole of Fishers Island previously carried on by the applicant.

F. A general statement briefly describing the facilities owned or operated for transmission of electric energy in interstate commerce or the sale of electric energy at wholesale in interstate commerce is as follows:

The applicant owns the two submarine cables and a tie cable shown on the map, Exhibit M attached hereto, extending from Fishers Island to the Borough of Groton, Connecticut, together with incidental equipment. There are no other facilities used and useful in connection with electric service on Fishers Island, which are operated for transmission of eelctric energy in interstate commerce, or the sale of electric energy at wholesale in interstate commerce.

* * * * * * [*3403*]

Territory and Population

Fishers Island is located on the eastern end of Long Island Sound, about 2½ miles from the Connecticut shore. It is part of

the town of Southold, Suffolk County, and in the parlance of its inhabitants the Island is divided into the so-called east end containing about 1800 acres of land and the so-called west end containing about 1100 acres. The Federal Government maintains a Coast Guard Station on the east end and Ft. Wright is located on the west end.

The approximate year round population at Fishers Island, exclusive of Ft. Wright, is about 700 inhabitants. In summer months the population, exclusive of Ft. Wright, is about 3,000 inhabitants.

History

Electric Operations

In 1889 E. M. & W. Ferguson purchased from the R. Fox estate approximately 95% of the land on Fishers Island.

[*3404*] Through a related company known as the Fishers Island Electric Light, Heat and Power Company, electricity was first supplied in 1899 to the west end of the island where early development occurred. Expenditures for electric plant were recorded on the books of this company until 1908. From January 1, 1908 until June 30, 1918, expenditures for electric plant were recorded on the books of E. M. & W. Ferguson. At June 30, 1918 a reorganization was effected wherein together with other property the electric plant was transferred to Fishers Island Farms, Inc. The latter company was incorporated in March, 1918.

In 1925 Fishers Island Corporation, incorporated March, 1925, purchased from Fishers Island Farms, Inc. the East End, excluding movable property such as meters and property held by other interests. The electric plant acquired was then reconstructed and extended.

From 1899 until 1922 electricity was generated in a small steam-driven generating plant on the west end of the island. In 1922 a submarine cable was installed between Munnatawket on the west end of Fishers Island and Groton Long Point, Conn. This cable was replaced in 1935 because of failure. The generating plant was abandoned after installation of the 1922 cable and thereafter

all power was purchased from the Groton, Conn. municipal system. A similar cable was laid to the east end of the island in 1926. In 1931 Munnatawket substation on the west end and Chocomount substation on the east end were connected by a submarine tie cable. There are now two supply cables between the mainland and the island.

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EXHIBIT 18.

BOROUGH OF GROTON CONNECTICUT

Water and Electric Department
A. N. Tiffany, Superintendent October 18, 1940

Mr. Leon M. Fuquay, Secretary Federal Power Commission Washington, D. C.

Dear Sir:

Upon rereading the copy of my letter of October 17th to you relative to the arrangements we have with the Connecticut Light and Power Company for the supply of power, I find that the last paragraph of the first page and the last two paragraphs of the second page do not convey the correct picture of the situation and I would therefore like to correct any erroneous impressions.

When we were negotiating with the Power Company for a new contract to become effective September 30, 1940, we were told that counsels for the Power Company advised it that the Borough of Groton had no charter rights to sell power to Fisher Island Farms, Incorporated, and that the Power Company knowing of such unauthorized sale should not become a party to such a transaction. They did agree to enter into a contract with the Borough for a supply of power for resale and ultimate use entirely within the chartered territory of the Borough of Groton and outlined the price, terms and conditions of such a proposal, which would result in a substantial decrease in the price of power to the Borough. This proposal is outlined in their letter of June 14, 1940, a copy of which you have.

The power Company has been very cooperative and helpful in making engineering layouts and estimates for a new substation we plan to build for an enlarged supply of power, a substantial amount of which we expect to sell to the Electric Boat Company. They have also offered further engineering assistance in connection with any negotiations we might have with the Electric Boat Co.

The Power Company representatives have also been cooperative in connection with an inquiry we received for breakdown service for the New London Submarine Base, which is located partly in the town of Groton and partly in the Town of Ledyard.

I would like to have these corrections made to my letter of October 17th.

Respectfully yours,

A. N. T. Supt.

BOROUGH OF GROTON WATER & ELECTRIC DEPT.

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* * * * * * [3422]

EXHIBIT 21.

February 27, 1941

Borough of Groton Connecticut

Attention: Water and Electric Department

A. N. Tiffany, Superintendent

Gentlemen:–

Acting on your official notification and request (voted by your Board of Utility Commissioners) as set forth in your letter to Fishers Island Farms, Inc., dated June 4, 1940, this Corporation as assignee of Fishers Island Farms, Inc., proceeded promptly to construct its own source of power on Fishers Island. This construction work was substantially completed on February 9, 1941 and accordingly, no electric energy has been purchased or received from you since February 8, 1941. After midnight on February 28, 1941, it will be unnecessary for you to supply us with any electric energy and you can sever connection with our cable.

We have greatly appreciated doing business with you for the past nineteen years and wish to thank you for your many courtesies.

Very truly yours,

THE FISHERS ISLAND ELECTRIC CORPORATION
By /s/ Henry L. Ferguson President

[*3423*]

EXHIBIT 22.

February 28, 1941

Mr. H. L. Ferguson, Pres. Fishers Island Electric Corp. Fishers Island, New York

Dear Mr. Ferguson:

We sincerely regret that we have been compelled to sever electric connections to the Fishers Island Farms and Fishers Island Electric Corporation with whom we have had very pleasant business relations for a long period of time. However, your instructions of the 27th instant will be carried out Saturday morning, March 1st.

We wish to thank you for your remittance of $2,060.34, for which receipt is herewith inclosed.

Very truly yours,

BOROUGH OF GROTON UTILITIES
Superintendent.

[*3424*]

EXHIBIT 23.

Copy October 23, 1940

Mr. A. N. Tiffany, Superintendent Water and Electric Department Borough of Groton Groton, Connecticut

Dear Mr. Tiffany:

Confirming our telephone conversation of this morning, we will be glad to bill you under the new power rate outlined in my letter

of June 14, 1940 beginning with the service rendered on and after the regular meter reading date about the middle of November, 1940. This will first apply, therefore, to the consumption used between the middle of November and the middle of December.

The demand charge will be based on the highest demand of the preceding twelve months and until such time as the Borough furnishes its own substation, the 11% rental charge on the present substation will be applied as an addition to the rate. The investment charge of 11% on the $5,307.01 investment in the circuit, which was built in 1931 from Chicken Farm Junction to Groton Long Point substation, will cease to be charged beginning with the bill for the service between the middle of October and the middle of November.

If this is in accordance with your understanding of the matter won't you please confirm it.

We would like to again emphasize the need for an early conclusion of the matter of the new substation to supply the Borough and the Electric Boat Company in the event that the Boat Company will require an appreciable amount of service at any early date because of the considerable period of time that will have to elapse from the date of ordering the necessary equipment for the substation and its delivery by the manufacturers. I would suggest that you impress upon the officials of the Electric Boat Company and/or their consulting engineers the fact that whatever necessary substation equipment would be required has got to be ordered from the manufacturers and delivery dates are lengthening on practically all types of equipment.

Yours very truly,

A. V. S. LINDSLEY
Vice President

AVSL/ek

[3425]

EXHIBIT 24.

BOROUGH OF GROTON
Connecticut

Copy October 30, 1940

Mr. A. V. S. Lindsley, Vice Pres. The Connecticut Light and Power Company 250 Freight Street Waterbury, Connecticut

Dear Mr. Lindsley:

We refer to your letter of October 23rd and wish to report that at the regular meeting of the Board of Utility Commissioners of the Borough of Groton, it was agreed that the Board approve and desire the purchase of electric power on the basis of the rate submitted in the afore-mentioned communication.

Very truly yours,

BOROUGH OF GROTON UTILITIES
/s/ A. N. Tiffany Superintendent

[3426]

EXHIBIT 25.

This Agreement made this 16th day of December 1936, by and between The Connecticut Power Company, hereinafter called the Seller, and The Connecticut Light and Power Company, hereinafter called the Buyer, both being corporations organized and existing by virtue of the laws of the State of Connecticut.

Witnesseth:

Whereas, the Seller entered into an agreement with the Central Connecticut Power and Light Company dated August 5, 1930, for the supply of electric power in various towns in Connecticut, and

Whereas, the Buyer is the successor to the Central Connecticut Power and Light Company, and

Whereas, the Buyer entered into a supplemental agreement with the Seller dated February 23, 1933 relative to the supply of electric power at Glastonbury, Connecticut, and

Whereas, the Seller and the Buyer desire to terminate said agreements and enter into a new agreement relative to the supply of electric power,

Now, Therefore, in consideration of the premises and of the mutual covenants and agreements herein contained the parties hereto covenant and agree with each other as follows:

Article I

It is mutually agreed that the said agreements of August 5, 1930 and February 23, 1933 between the Seller and the Buyer shall terminate on December 31, 1936.

[3427] Article II

Commencing January 1, 1937 the Seller agrees to supply and the Buyer agrees to take and pay for electric power under the terms and conditions as hereinafter set forth.

Article III

The Seller agrees to supply such amount of electric power as the Buyer may need for delivery in the East Hampton section of the Buyer's Central District, so called. Said electric power shall be in the form of 3 phase 60 cycle alternating current and shall be delivered and metered at approximately 13,600 volts at the Seller's pole No. 110 at Penfield Hill in the town of Portland.

Article IV

The price to be paid by the Buyer to the Seller for electric power supplied hereunder shall consist of a demand charge of $1.50 per month per kilowatt of demand and an energy charge of 5 mills per kilowatt hour for all current delivered.

Said energy charge is based on the cost to the Seller of fuel equivalent to coal meeting the following specifications

Volatile matter		15 to 23%
Ash		3 to 5%
Sulphur	not to exceed	1.5%
Fixed carbon		71 to 79%
Btu's	about	14,700 per lb

and costing $5.30 per net ton delivered in the bunkers of The Hartford Electric Light Company's power stations at Hartford. Should the cost of fuel on such basis be more than $5.55 or less than $5.05 per net ton, then for each one cent increase above $5.55 or decrease below $5.05 [*3428*] the energy charge shall be increased or decreased respectively by seven ten-thousandths of a cent per kilowatt hour. The average cost of fuel used during the period of any three consecutive months shall determine the amount of such increase or decrease in the energy charge for the next succeeding month.

The method of determining the demand shall be by demand meter, the interval being thirty minutes, and the demand for billing purposes shall be the highest single thirty minute demand as registered by said meter during the last elapsed twelve months.

The price for electric power as set forth herein is based upon the present level of taxation as imposed by existing tax laws insofar as such taxation affects the cost of producing and delivering the electric power covered by this agreement. In the event of substantial variation from such level or in the event of the imposition of any tax clearly earmarked as applicable to the electric power covered by this agreement such as a gross earnings tax or a sales tax, then said price shall be subject to review and adjustment by mutual agreement in the light of such variation. In case of disagreement as to any such adjustment the matter shall be referred for decision to an arbitrator to be selected by the parties hereto and if they cannot agree upon an arbitrator either party may call upon the Chairman of the Public Utilities Commission to select an arbitrator.

Bills shall be rendered on or about the first day of each month for electric power supplied during the previous month and shall be paid on or before the 15th day of such month.

[*3429*] The Seller shall furnish the Buyer a quality of service, including voltage regulation, frequency and freedom from interruptions, which shall compare favorably with similar service furnished elsewhere by other companies where accepted good practice prevails.

Power factor shall be governed by day to day operating understandings between the Seller and the Buyer and in case of failure to agree the Buyer shall maintain, for such reasonable load period or periods as the Seller may from time to time request, a power factor of not less than 80% lagging.

Article V

The term of this agreement shall extend until January 1, 1939 but may be terminated by the Buyer at any time prior to said date upon written notice to the Seller.

Article VI

It is mutually understood and agreed that this agreement succeeds and takes the place of all prior agreements, promises or understandings, expressed or implied, relating to the supply of electric power by the Seller to the Buyer at Glastonbury and at Portland.

Article VII

The successors and assigns to the parties hereto shall be entitled to the rights and benefits of and shall be bound by this agreement; but no assignment of the rights of either party shall be valid without the consent in writing of the other. A consolidation or merger of either party with another corporation or the placing of a general mortgage by either party upon its property shall not be construed as an assignment within the meaning of this Article.

[*3430*] In Witness Whereof, the Seller and the Buyer have caused this agreement to be executed in duplicate by their proper officers thereto duly authorized and their respective corporate seals to be hereto affixed the day and year first above written.

THE CONNECTICUT POWER COMPANY

By V E Bird President

Attest: C B Dana Secretary

THE CONNECTICUT LIGHT AND POWER COMPANY

By Irvin W. Day Vice President

Attest: P. R. Fleming Secretary

STATE OF CONNECTICUT
COUNTY OF HARTFORD ss

Hartford, December 16th 1936

Personally appeared V. E. Bird, President of The Connecticut Power Company signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of The Connecticut Power Company, before me.

EDNA L. NEUMANN
Notary Public

[*3431*] STATE OF CONNECTICUT
COUNTY OF NEW HAVEN ss

Waterbury, December 16, 1936

Personally appeared Irvin W. Day, Vice President of The Connecticut Light and Power Company signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of The Connecticut Light and Power Company, before me.

KATHARINE K. STARBUCK
Notary Public

[*3432*] Copy

THE CONNECTICUT LIGHT & POWER CO.
36 PEARL STREET, HARTFORD, CONNECTICUT

R. H. Knowlton Vice President November 7, 1938

Mr. Viggo E. Bird, President The Connecticut Power Company
Hartford, Connecticut

Dear Mr. Bird:

In accordance with our telephone conversation of this afternoon, reference to our contract with your Company for the purchase of power in our East Hampton section indicates a termination date on or before January 1, 1939. The recent storm which occasioned a vast amount of rehabilitation work calls for a change in the completion date of some of our regular construction projects. We would, therefore, like to postpone the termination of

your supply of power until the first of May, 1939. This will enable us to concentrate our forces on the aforementioned rehabilitation job.

I understood you to say that the May 1st date will be satisfactory to you. We very much appreciate your cooperation.

Very truly yours,

/s/ R. H. KNOWLTON

RHK:W R. H. Knowlton Vice President

[*3433*] Mr. Colvin

November 8, 1938

Mr. R. H. Knowlton, Vice President The Connecticut Light & Power Co. 36 Pearl Street Hartford, Conn.

Dear Mr. Knowlton:

I refer to your letter of the seventh, with reference to the contract with your company for the purchase of power from the Middletown Division of this company for your East Hampton section. This contract is dated December 16, 1936, and has a termination date on or before January 1, 1939.

Your letter indicates a desire to have the termination date extended until the first of May, 1939.

Needless to say, our desire is always to cooperate with you in any possible way we can and we are, therefore, glad to comply with your request in this regard.

Yours very truly,

THE CONNECTICUT POWER COMPANY

V. E. Bird President

[Stamped:]

Received Nov 10 1938 Route

VEB:HV ADC Recd 10 1938 A.D.C. RBC R.B.C.

For Contract File Copy for Gen. File

[3434] Copy

THE CONNECTICUT LIGHT & POWER COMPANY

36 Pearl Street Hartford, Conn.

April 10, 1939

Mr. Samuel Ferguson, President The Connecticut Power Company
Hartford, Connecticut

Dear Mr. Ferguson:

The arrangement which Mr. Day had with your company contemplated discontinuance of your supply of power to us in our East Hampton section January 1, 1939. As a result of the storm we were unable to complete the necessary construction for the taking over of the load on to our system by that date, as recited in my letter of November 7, 1938. Your company, therefore, consented to continue the supply to us until May 1, 1939. I am now advised that we were too optimistic in naming that date, and would like to know whether you can continue the supply until July 1, 1939. We will very much appreciate your consideration.

Very truly yours,

/s/ R. H. KNOWLTON

R. H. Knowlton
Executive Vice President

[3435] April 11, 1939.

Mr. R. H. Knowlton Executive Vice President The Connecticut Light and Power Company 36 Pearl Street, Hartford, Connecticut.

Dear Mr. Knowlton:

I am advised that there are no conditions in Middletown which would cause us any inconvenience in continuing to serve your East Hampton section until July 1, 1939 as requested in your favor of April 10th and, therefore, we are very glad to comply

with your request. We will handle the matter in accordance with your convenience.

Very truly yours,

SAMUEL FERGUSON President

cc: Mr. Colvin Mr. Packard

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* * * * * * [3443]

EXHIBIT 30.

Files 11/19/37 W.D. Eng.

THE CONNECTICUT POWER COMPANY
266 Pearl Street Hartford, Conn.

November 8, 1937.

[Stamped:
[Federal Power Commission Received Nov—9 1937
Rec'd Nov—9 1937 Division of Rates Basis and Valuation]

Federal Power Commission, Washington, D.C.
Att'n: Mr. Jamieson and Mr. Morgan.

Gentlemen:

Pursuant to your request expressed at our informal conference on October 22nd, please find enclosed the following papers:

Six (6) copies of the contracts of this Company with the following companies:

The Hartford Electric Light Company (2 contracts)
The Connecticut Light and Power Company
The Torrington Electric Light Company
(statement only)

Three (3) copies each of a statement showing the monthly sales under the aforesaid contracts from June 1936.

The report of sales contains such information as we are able to furnish. We commenced with the month of June 1936 because that was the effective date of the major contracts. The Connecticut Light and Power Company contract was effective as of January 1st 1937.

As stated before, we feel that these contracts are all intrastate contracts for primary power generated within the State of Connecticut and for distribution within the State.

[*3444*] You inquired about The Bolton Electric Company. This was formerly a subsidiary of The Manchester Electric Company which was wholly owned by The Connecticut Power Company and as of June 30th 1936 both The Manchester Electric Company and The Bolton Electric Company were merged into and with The Connecticut Power Company. The same is true of The Union Electric Light and Power Company. Also, I might add that both these territories are fed by separate lines, 11,000 volt to Manchester and 22,000 volt to Farmington, neither of which are connected except in a very indirect manner with the interconnected 66,000 volt transmission lines.

Let me again express our appreciation of your courtesy in Washington and also our desire to cooperate in any way possible.

Sincerely yours,

AUSTIN D. BARNEY,
Austin D. Barney,
General Counsel.

Encls. ELN.

[*3445*] REPORT ON SALES OF ELECTRIC ENERGY UNDER CERTAIN CONTRACTS OF THE CONNECTICUT POWER COMPANY (OPERATING IN THE STATE OF CONNECTICUT)

[Stamped: Federal Power Commission Received Nov—9 1937
Rec'd Nov 9 1937 Division of Rates Basis and Valuation]

I. Contract with The Hartford Electric Light Company made as of June 1, 1936 as renewed June 7, 1937 and contract with the same Company dated June 8, 1937 relative to covering The Connecticut Power Company's power obligations to The Connecticut Light and Power Company at Bristol, Connecticut.

A. Electric Energy Delivered

1936	KWHrs.	Total Charge
June	305,000	$1,946.24
July	6,000	927.33
August	36,000	1,064.28
September	5,000	282.07
October	776,000	1,798.00
November	936,000	2,195.77
December	2,525,000	6,666.70
7 mos. 1936	4,589,000	$14,880.39
1937		
January	3,703,000	8,542.42
February	1,778,000	4,011.39
March	190,000	438.47
April	3,701,000	10,858.21
May	4,964,000	12,265.29
June	2,477,000	5,934.68
July	703,000	1,761.35
August	—	10.92
September	2,000	133.24
9 mos. 1937	17,518,000	$43,955.97

NOTE: The contract dated June 8, 1937 calls for no delivery of power to The Hartford Electric Light Company. The above table represents transactions only under contract dated as of June 1, 1936 as renewed June 7, 1937.

[*3446*] Demand and Energy Charge: There is no demand charge for power delivered insomuch as The Hartford Electric Light Company does not contract for any primary power. The energy charge is incremental cost which varies from time to time.

Point of Delivery: 11,000 volt Bus at The Hartford Electric Light Company's South Meadow Plant, Hartford, Connecticut.

B. Electric Energy Received

1936	KW Demand Regular	KW Demand Bristol (1)	Demand Charge Regular	Demand for Charge Bristol (1)	KWHrs.	KWHr. Charge	Total
June	22,500	9,160	$15,000.00	$13,740.	23,139,820	$60,957.77	$89,697.77
July	22,500	9,160	15,000.00	13,740.	28,148,300	76,486.54	105,226.54
Aug.	22,500	9,160	15,000.00	13,740.	28,599,200	78,695.72	107,435.72
Sept.	22,857	9,160	15,952.00	13,740.	23,034,760	65,003.83	94,695.83
Oct.	23,992	9,160	18,978.66	13,740.	20,014,589	53,488.11	86,206.77
Nov.	24,559	9,160	20,490.66	13,740.	14,919,713	39,365.31	73,595.97
Dec.	24,559	9,160	20,490.66	13,740.	11,674,213	30,737.83	64,968.49
7 mos. 1936			$120,911.98	$96,180.	149,530,595	$404,735.11	$621,827.09
1937							
Jan.	24,059	13,104	$19,157.33	19,656.	3,178,893	7,219.51	46,032.84
Feb.	24,059	13,104	19,157.33	19,656.	5,825,024	13,763.57	52,576.90
Mar.	24,059	13,104	19,157.33	19,656.	16,247,432	41,164.53	79,977.86
Apr.	23,473	13,104	17,594.67	19,656.	5,252,184	12,910.23	50,160.90
May	23,473	13,464	17,594.67	20,196.	3,826,218	8,993.00	46,783.67
June	23,473	13,536	17,594.67	20,304.	8,853,836	22,852.66	60,751.33
July	23,473	13,536	17,594.67	20,304.	20,492,327	58,912.91	96,811.58
Aug.	23,473	13,896	17,594.67	20,844.	26,022,781	79,726.31	118,164.98
Sept.	23,972	14,544	18,925.33	21,816.	23,225,899	69,706.25	110,447.58
9 mos. 1937			$164,370.67	$182,088.	113,424,564	315,248.97	$661,707.64

Demand Charge:

(a) Under contract of June 1, 1936 for The Connecticut Power Company's own requirements—$180,000 per annum up to total demand of 22,500 (see amendment)—rate of $32.00 per KW per annum for all excess.

(b) Under contract covering Bristol supply dated June 8, 1937 —$1.50 per KW per month.

NOTE: (1) Prior to written contract and from January 1, 1937, The Hartford Electric Light Company was supplying power to The Connecticut Power Company for Bristol on same terms and prior to January 1, 1937 under arrangements superseded by the January 1, 1937 contract.

[3447] Chief Engineer Files 9/17/37 fcs.

THE CONNECTICUT POWER COMPANY
266 Pearl Street Hartford, Conn.

[Stamped: Federal Power Commission Received Sep 13 1937]

September 10, 1937.

Federal Power Commission, Washington, D. C.

Att'n: Mr. Fuquay.

Dear Sir:

Mr. Curran, Secretary of this Company, referred to me your letter of September 7th inquiring about a reply to your letter of June 28, 1937, concerning certain contracts of the Company.

We were under the impression that we had covered the points that you raise in our letter of June 9th. Perhaps our position could be stated more clearly as follows: The contract between The Hartford Electric Light Company and The Connecticut Power Company is a firm power contract for steam station capacity at Hartford. The Connecticut Power Company has no steam station in this section of its territory and The Hartford Electric Light Company has always furnished it with its requirements. The Connecticut Power Company has to obtain sufficient steam capacity for supplying its load on its interconnected system from someone and has always obtained it within the State of Connecticut. It never has had any contract, oral or written, for firm capacity outside of the State of Connecticut, consequently, we do not see how this contract calls for or in any way is connected with the sale of electricity in interstate commerce.

It may be true that some of the energy delivered by The Connecticut Power Company to The Hartford Electric Light Company or to The Connecticut Light and Power Company and The Torrington Electric Light Company may at times have interstate origin by virtue of the operation of the Connecticut Valley Power Exchange. However, there is no contractual relationship between the operation of the Exchange and the intrastate companies in

Connecticut and there is nothing in the specific contracts you have referred to which creates any interstate obligation, either as to sale or transmission. The Exchange agreement, so-called, involves only surplus power when, as, and if available and is in reality merely a voluntary operating plan, subject to termination at will by any of the participating parties [*3448*] and is not in any sense a contract. The very nature of the Exchange transactions are such that no firm power contract could be based thereon.

As to filing any monthly reports on the Form IT-1, the same difficulties arise except more so as were found in reporting the Exchange transactions on this form. There being no direct transactions between companies in respect to any interstate energy, it is impossible to use that form. This was discussed with the Commission in respect to the Exchange and a satisfactory form worked out which has been filed monthly since July 1936. In the case of the contracts under discussion, there is a further difficulty—it would be almost impossible to trace the amount of energy received from outside of the state that might be ultimately delivered to The Hartford Electric Light Company, The Connecticut Light and Power Company at Bristol or to The Torrington Electric Light Company. Even if this was available, which the engineers inform me would be very difficult to obtain in any degree of accuracy in most cases, there is no other information that could be set out on the form IT-1, because the contracts under discussion have nothing to do with any interstate exchange and the transactions thereunder cannot be translated into the information called for by said form. The interstate transactions in which the Company is involved are fully covered by the monthly reports of the Connecticut Valley Power Exchange.

I mention these points illustrative of the difficulties in complying with your request. We desire to cooperate in any reasonable way possible, and I believe the record of this Company as well as that of The Hartford Electric Light Company in supplying information to your Commission from time to time and on the general information reports sent out bears us out in this statement.

If you deem it desirable I should be glad to talk it over with a representative of the Commission and with their Engineers at any time at your convenience.

Sincerely yours,

AUSTIN D. BARNEY,
Austin D. Barney,
General Counsel. 9/13

[3449] Files E Ex 30 See Tr. pg. 603

6029 Jun 28 1937

The Connecticut Power Company, 266 Pearl Street, Hartford, Connecticut.

Attention: Mr. R. B. Curran, Secretary-Treasurer.

Gentlemen:

This will acknowledge your letter of June 9, 1937, inclosing one copy each of your agreements with The Connecticut Light and Power Company, dated December 16, 1936, Hartford Electric Company, dated June 1, 1936, and Hartford Electric Light Company, dated June 8, 1937; and setting forth certain details of your agreement with the Torrington Electric Light Company.

Your letter indicates that your company does not consider the above-mentioned agreements subject to filing under Rule 205 of Federal Power Commission Order No. 44. The reasons advanced to support this contention are that these agreements involve only "the purchase and sale of power between local companies and for local distribution in the State of Connecticut".

As a means of clarifying the above expression, your comment is requested with respect to the following:

By virtue of the agreements of July 1, 1936, and August 1, 1936, your company became a party to the interchange of energy with New England Power Company, Turner's Falls Power and Electric Company, and Central Hudson Gas and Electric Company. It seems probable that some of the energy received from the Hartford Electric Light Company under the agreements of June 1,

1936 and June 8, 1937, would ultimately be delivered to one or more of the companies named above in Massachusetts or New York. It appears even more likely that a portion of the energy delivered by your company to Hartford Electric Light Company under the contract of June 1, 1936, originates outside of the State of Connecticut.

Similarly, energy delivered to the Connecticut Light and Power Company under the agreement dated December 16, 1936, and to the Torrington Electric Light Company, may, in part at least, be derived from sources outside the State. In the case of the Connecticut Light and Power Company, it is recognized that the agreement of June 8, 1937, with the Hartford Electric Company [3450] is expressly intended to cover the supply of energy under this contract. However, energy is delivered by the Hartford Electric Light Company to your company at its South Meadow plant in Hartford and is transmitted over lines which are apparently interconnected with all parts of your system. It is, therefore, conceivable that part of the energy ultimately delivered to the Connecticut Light and Power Company at Bristol is of an interstate character.

In view of the foregoing, it would appear that the contracts which you submit, including the oral agreement with the Torrington Electric Light Company should be filed with the Commission pursuant to Rule 205 of Order No. 44. In addition, a record of the transactions under these agreements should be reported on Form JT-1, as requested.

Very truly yours,

LEON M. FUQUAY
Leon M. Fuquay,
Acting Secretary.

FCJ:emb JM. CAD
6-23-37
Distribution of copies:
Files—2
R. C. & V.—Contract—3
B. of L.—Solicitor
Regional Office—New York

Secretary
Mr. Davenport
A Rumus DT

[3451]

EXHIBIT 31.

CERTIFICATE

This is to certify that the rate at which The Connecticut Power Company is now serving, and has been serving since June 1, 1936, to The Torrington Electric Light Company for electric energy at wholesale is as follows:

Demand Charge of $1.75 per K.W. of maximum yearly demand less an allowance of 2,500 K.W. for steam station capacity held in reserve by The Torrington Electric Light Company/

Energy Charge is nine (9) mills per K.W. Hr. for the first 160 hours use of the demand and five (5) mills per K.W. Hr. for the excess.

THE CONNECTICUT POWER COMPANY,
By V. E. Bird, President.

Dated November 8, 1937.

[3452]

EXHIBIT 32.

April 16, 1936

Mr. Samuel Ferguson, Chairman of the Board The Hartford Electric Light Company Hartford. Connecticut.

Dear Mr. Ferguson:

Following our discussion on April 13th concerning the question of restrictions on the use of the emergency temporary connection which has been made to the Agawam line, I put the matter up to Carmody & Thomas and I enclose copy of their reply and by which I feel we must be guided in the use that is made of the facilities.

Yours very truly,

IWD:KS
Enclosure

Irvin W. Day
Vice President

Mr. King Please note JWD GEK

[NOTE: The second page of Exhibit 32 (p. 3452) is a copy of Exhibit 56 (pp. 3597–3598) printed 1131, 1132, *infra.*]

EXHIBIT 33.

[NOTE: Exhibit 33, pp. 3454–6, is a photostatic reproduction of a carbon copy (on plain paper without the letterhead) of the letter of which Exhibit 48, pp. 3562–3564, printed 1115–1118, *infra*, is a photostatic copy.]

EXHIBIT 34.

[NOTE: Exhibit 34, pp. 3457–3461, is a copy of Exhibit 47, pp. 3557–3561, printed 1107–1113, *infra.*]

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* * * * * * [*3462*]

EXHIBIT 35.

CONNECTICUT VALLEY POWER EXCHANGE

Savings to the C. L. & P. Co.
for Twelve Months Ending August 1935

Sept. 1934	$5,779.44
Oct.	4,938.95
Nov.	9,377.69
Dec.	4,198.38
Jan. 1935	3,895.37
Feb.	3,050.42
March	8,114.33
April	9,870.25
May	9,257.69
June	13,198.37
July	7,487.58
Aug.	4,938.04
Total	$84,106.51

* * * * * * [3463]

EXHIBIT 36.

Copy

The Connecticut Power Company to
Schedule FPC No. 3
Effective Date—June 1, 1936
Filing Date—November 9, 1937

Agreement made as of June 1st 1936 by and between The Hartford Electric Light Company, a duly organized Connecticut Corporation with its principal office in the Town and County of Hartford, State of Connecticut, and The Connecticut Power Company, a duly organized Connecticut Corporation with its principal office in said Hartford, Witnesseth:

Whereas, The Connecticut Power Company owns certain water power plants in the State of Connecticut; and

Whereas, said The Connecticut Power Company requires additional power beyond the capacity of its water power plants for the primary requirements of its own system; and

Whereas, The Hartford Electric Light Company is the owner of steam plants in the State of Connecticut which have sufficient capacity to supply The Connecticut Power Company with its primary needs as hereinafter set out; and

Whereas, the water power plants of The Connecticut Power Company and the steam plants of The Hartford Electric Light Company can be operated in conjunction to serve the combined loads of both companies with greater efficiency than if the facilities of each were applied primarily to the requirements of its own system; and

Whereas, both parties are willing to so operate.

Now, Therefore, in consideration of the premises, the parties hereto agree as follows:

General

1. That the use of water storage at all our plants of both companies shall be under the control of the Load Dispatcher of The Hartford Company in order that the same may be used to the fullest extent possible in caring for short peak loads.

2. In all transactions the obligations and prices (hereinafter set out) for capacity shall be treated as separate and distinct from obligations and prices for energy.

Energy Cost

3. All energy supplied by either party to the other shall be at The Hartford Electric Light Company's incremental cost; the [*3464*] point of delivery or reception by The Hartford Electric Light Company shall be at the 11,000 volt bus at The Hartford Electric Light Company's South Meadow Plant at Hartford, Connecticut, and all energy shall be measured at this point.

Primary Capacity

4. The Hartford Company agrees to supply primary capacity to The Connecticut Power Company as may be required in addition to the capacity of The Connecticut Power Company's own water power plants to carry the present agreed base primary loads of The Connecticut Power Company in the following load centers:

	Base Load
Middletown	6950
Thomaston	1400
Torrington	6400
Housatonic Local—Falls Village	1750
Manchester	4200
Unionville	1800

For this primary capacity The Connecticut Power Company agrees to pay The Hartford Electric Light Company the sum of One Hundred and Eighty Thousand Dollars ($180,000.00) per annum, payable monthly in approximate equal installments.

5. The Hartford Company further agrees to furnish additional capacity as may be required from time to time by The Connecticut Power Company for its primary loads in the load centers set out in Section 4.

For any such additional primary capacity, The Connecticut Power Company agrees to pay the Hartford Company at the rate of Thirty-two Dollars ($32.) per K.W. per annum, payable monthly.

The Connecticut Power Company agrees to maintain suitable measuring instrument for determining the load at the aforesaid load centers which instrument shall be available for inspection by the Hartford Company at all reasonable times. For purposes of determining the increase at the various load centers, the primary load shall be the maximum load recorded for any thirty (30) minute interval and the increase will be the excess of such [*3465*] maximum load over the base load for such load center specified in Section 4. The billing for such additional capacity shall commence the month next succeeding that in which such additional capacity is established.

6. In the event of power shortage from any cause The Hartford Electric Light Company agrees to reimburse The Connecticut Power Company for all capacity it may have to obtain from other sources for the aforesaid load centers to the amount of the cost of such capacity to The Connecticut Power Company.

Term

7. It is mutually agreed that this contract shall be for a year and may be renewed from year to year by written notice by either party which shall be accepted by the other party. It is further agreed that the charges contained herein shall be subject to annual review and may be changed from time to time by mutual agreement of the parties, providing any such change shall be in writing, endorsed by the parties hereto and copy filed with the Public Utilities Commission as may be required by law.

This agreement shall inure to the benefit of the successors and assigns of both parties hereto.

In Witness Whereof, the parties hereto acting by their duly authorized officers have hereunto set their hands and seals as of the day and year first above written.

THE HARTFORD ELECTRIC LIGHT COMPANY,
By V. E. Bird, President.

THE CONNECTICUT POWER COMPANY,
By Allan D. Colvin Vice President.

[*3466*]

The Connecticut Power Company
Supplement No. 1
Effective Date—June 1, 1936
Filing Date—November 9, 1937
to
Rate Schedule FPC No. 3

AMENDMENT TO POWER CONTRACT DATED AS OF JUNE 1ST 1936.

It is mutually agreed that Section 5 of the Power Contract made as of June 1st 1936 by and between the undersigned, be and is hereby amended by the addition of the following:

> Provided no additional capacity shall accrue until the total of the highest measured demands at each load center occurring in any month shall exceed 22,500 K.W. and the additional capacity shall be only the excess of such total over 22,500 K.W.

Nothing herein shall be construed as changing said contract in any other respect.

In Witness Whereof, the parties hereto acting by their duly authorized officers have hereunto set their hands and seals as of the first day of June 1936.

THE HARTFORD ELECTRIC LIGHT COMPANY,
By: V. E. Bird President.

THE CONNECTICUT POWER COMPANY,
By Allan D. Colvin, Vice President.

[3467] Copy

The Connecticut Power Company
Supplement No. 2
Effective Date—November 9, 1937
Filing Date—November 9, 1937
to
Rate Schedule FPC No. 3

THE HARTFORD ELECTRIC LIGHT CO.
266 Pearl Street, Hartford, Conn.

June 7, 1937.

[Stamped: Federal Power Commission Received Nov—9 1937]

The Connecticut Power Company, 31 Union Street, New London, Connecticut.

Gentlemen:

The Agreement made as of June 1st 1936 by and between this Company and your Company relative to the cooperative use of your water power plant and our steam plant and the supplying of primary capacity to you for load centers in Middletown, Thomaston, Torrington, Falls Village, Manchester and Unionville has expired.

Pursuant to Paragraph VII of said Agreement, we hereby notify you that we desire to renew and continue said contract for another year, that is to say until June 1st 1938. If this is agreeable to you, will you please endorse your acceptance of the renewal of said contract on one copy of this letter and return the same to us.

Sincerely yours,

THE HARTFORD ELECTRIC LIGHT COMPANY,

Austin D. Barney,
Vice President–General Counsel.

The Connecticut Power Company hereby accepts the renewal of

the above mentioned contract for a period of one year to June 1st 1938.

THE CONNECTICUT POWER COMPANY,

By Allan D. Colvin Vice President.

[Stamped across face: "Superseded".]

[3468] Copy Files

Connecticut Power Company
Supplement No. 3
Effective Date—
Filing Date—September 1, 1939
to
Rate Schedule FPC No. 3
(Supersedes Supplement No. 2 to
Rate Schedule FPC No. 3)

THE HARTFORD ELECTRIC LIGHT CO.

266 Pearl Street Hartford, Conn.

May 4th 1938

The Connecticut Power Company 31 Union Street New London, Connecticut

Gentlemen:

The Agreement made as of June 1st 1936 by and between this Company and your Company relative to the cooperative use of your water power plant and our steam plant and the supplying of primary capacity to you for load centers in Middletown, Thomaston, Torrington, Falls Village, Manchester and Unionville will expire on June 1st 1938.

Pursuant to Paragraph VII of said agreement, we hereby notify you that we desire to renew and continue said contract for another year, that is to say until June 1st 1939. If this is agreeable to you,

will you please endorse your acceptance of the renewal of said contract on one copy of this letter and return the same to us.

Sincerely yours,

THE HARTFORD ELECTRIC LIGHT COMPANY,

/s/ AUSTIN D. BARNEY
Austin D. Barney
Vice President–General Counsel

The Connecticut Power Company hereby accepts the renewal of the above mentioned contract for a period of one year to June 1st 1939.

THE CONNECTICUT POWER COMPANY,
By /s/ Allan D. Colvin Vice President

[Stamped across face: "Superseded".]

[3469] Copy Files

Connecticut Power Company
Supplement No. 4
Effective Date—June 1, 1939
Filing Date—September 1, 1939
to
Rate Schedule FPC No. 3
(Supersedes Supplement No. 3 to
Rate Schedule FPC No. 3)

THE HARTFORD ELECTRIC LIGHT CO.
266 Pearl Street Hartford, Conn.

May 2, 1939

The Connecticut Power Company 31 Union Street New London

Gentlemen:

The Agreement made as of June 1st 1936 by and between this Company and your Company relative to the cooperative use of your water power plant and our steam plant and the supplying of primary capacity to you for load centers in Middletown, Thomas-

ton, Torrington, Falls Village, Manchester and Unionville will expire on June 1st 1939.

Pursuant to Paragraph VII of said Agreement, we hereby notify you that we desire to renew and continue said contract for another year, that is to say until June 1st 1940. If this is agreeable to you, will you please endorse your acceptance of the renewal of said contract on one copy of this letter and return the same to us.

Sincerely yours,

THE HARTFORD ELECTRIC LIGHT COMPANY,

/s/ AUSTIN D. BARNEY

Austin D. Barney

Vice President–General Counsel.

The Connecticut Power Company hereby accepts the renewal of the above mentioned contract for a period of one year to June 1st 1940.

THE CONNECTICUT POWER COMPANY

FLN By /s/ Allan D. Colvin Vice President

[Stamped across face: "Superseded".]

[NOTE: Pages 3476–3481, inclusive, of this exhibit is a photostatic reproduction of Exhibit 8, pages 3126–3131, printed pp. 1039–1043, *infra.*]

[3470] Files

The Connecticut Power Company
Supplement No. 5
Effective date—June 1, 1940
Filing date—May 4, 1940
to
Rate Schedule FPC No. 3
(Supersedes Supplement No. 4)

THE HARTFORD ELECTRIC LIGHT COMPANY
266 Pearl Street Hartford Conn.

April 22, 1940.

[Stamped: Federal Power Commission Received May 4—1940]

The Connecticut Power Company 31 Union Street, New London, Connecticut.

Gentlemen:

The Agreement made as of June 1st 1936 by and between this Company and your Company relative to the cooperative use of your water power plant and our steam plant and the supplying of primary capacity to you for load centers in Middletown, Thomaston, Torrington, Falls Village, Manchester and Unionville will expire on June 1st 1940.

Pursuant to Paragraph VII of said Agreement, we hereby notify you that we desire to renew and continue said contract for another year, that is to say, until June 1st 1941. If this is agreeable to you, will you please endorse your acceptance of the renewal of said contract on one copy of this letter and return the same to us.

Sincerely yours,

THE HARTFORD ELECTRIC LIGHT COMPANY,

/s/ AUSTIN D. BARNEY
Austin D. Barney
Vice President—General Counsel.

The Connecticut Power Company hereby accepts the renewal of the above mentioned contract for a period of one year to June 1st 1941.

THE CONNECTICUT POWER COMPANY

ELN. By Allan D. Colvin Vice President

[*3471*]

EXHIBIT 37.

This Agreement made this 8th day of June 1937, by and between The Hartford Electric Light Company, hereinafter called the "Seller", and The Connecticut Power Company, hereinafter called the "Buyer", both being corporations organized and existing by virtue of the laws of the State of Connecticut.

Witnesseth:

Whereas, the Buyer is supplying electric power to The Connecticut Light and Power Company at Bristol, Connecticut, under an agreement dated December 16, 1936; and

Whereas, the Seller has been up to the time of this Agreement supplying the Buyer with the necessary electric power for it to perform said contract of December 16, 1936; and

Whereas, the Buyer desires to enter into an agreement for the supply of such electric power as may be required by the terms of said Agreement of December 16, 1936 for a term equal to the term of said contract and the Seller is willing to supply such electric power.

Now, Therefore, in consideration of the premises and of the mutual covenants and agreements herein contained, the parties hereto covenant and agree with each other as follows:

Article I

Commencing as of this day the Seller agrees to supply and the Buyer agrees to take and pay for electric power under the terms and conditions as hereinafter set forth.

[*3472*] Article II

The Seller agrees to supply and the Buyer agrees to take all the Buyer's requirements under Article III of said Agreement of

December 16, 1936 by and between the Buyer and The Connecticut Light and Power Company relative to supplying The Connecticut Light and Power Company with its requirements of electric power for its Bristol District. A copy of said Agreement is attached hereto and reference is hereby made to Article III of said Agreement for a more particular description of the obligations under this Article II.

The quality of service furnished by the Seller shall be equivalent to that required by Article III of said Agreement of December 16, 1936.

Article III

The price to be paid by the Buyer to the Seller for electric power supplied hereunder shall consist of a demand charge of $1.50 per month per kilowatt of demand and an energy charge of the incremental cost per K.W. Hr. of the Seller at its steam generating station located at South Meadow, so-called, in the Town and County of Hartford, State of Connecticut.

The point of delivery for all current shall be on the 11,000 volt (bus) side of the Buyer's 66,000 volt substation located adjacent to said Seller's South Meadow Plant and all energy shall be measured at this point.

The demand shall be the same as determined under the contract of December 16, 1936 between the Buyer and The Connecticut Light and Power Company.

The price for electric power as set forth herein is based upon the present level of taxation as imposed by existing tax laws insofar as such taxation affects the cost of producing and delivering the electric [3473] power covered by this Agreement. In the event of substantial variation from such level, or, in the event of the imposition of any tax clearly earmarked as applicable to the electric power covered by this agreement, such as gross earnings tax or a sales tax, then said price shall be subject to review and adjustment by mutual agreement in the light of such variation. In case of disagreement as to any such adjustment the matter shall be referred for decision to an arbitrator to be selected by the parties

hereto and if they cannot agree upon an arbitrator either party may call upon the Chairman of the Public Utilities Commission to select an arbitrator.

Bills shall be rendered on or about the tenth day of each month for electric power supplied during the previous month and shall be paid on or before the fifteenth day of each month.

Article IV

The term of this agreement shall extend until January 1, 1947 and thereafter until the expiration of two years' written notice from one party to the other, which said notice may be given at any time after December 31, 1944.

Article V

It is mutually understood and agreed that this agreement in no way affects or is connected with an agreement made as of June 1, 1936 by and between the Buyer and the Seller relating to the supply of power to the Buyer for its own requirements and co-operative use of the steam and water power facilities of both parties.

[*3474*] Article VI

The successors and assigns to the parties hereto shall be entitled to the rights and benefits of and shall be bound by this agreement; but no assignment of the rights of either party shall be valid without the consent in writing of the other. A consolidation or merger of either party with another corporation or the placing of a general mortgage by either party upon its property shall not be construed as an assignment within the meaning of this Article.

In Witness Whereof, the Seller and the Buyer have caused this agreement to be executed in duplicate by their proper officers thereto duly authorized and their respective corporate seals to be hereto affixed the day and year first above wri n.

THE HARTFORD ELECTRIC LIGH COMPANY,
V. E. Bird Pres.

THE CONNECTICUT POWER COM ANY
By Allan D Colvin Vice-Pres.

STATE OF CONNECTICUT,
COUNTY OF HARTFORD. June 8, 1937.

Personally Appeared, V. E. Bird President of The Hartford Electric Light Co. Signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of said The Hartford Electric Light Company, before me.

LEONARD DALAY,
Notary Public ADC 4/3/4

[3475] STATE OF CONNECTICUT,
COUNTY OF HARTFORD. June 8, 1937

Personally Appeared, Allan D. Colvin, vice president of The Connecticut Power Company, Signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of said The Connecticut Power Company, before me.

JOHN R. DONAHUE,
Notary Public.

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* * * * * * [3483]

EXHIBIT 39.

An arrangement has been made between the New England Power Company, The Connecticut Power Company and the Turners Falls Power & Electric Company on a day-to-day basis to exchange surplus power so that the lowest available increment cost sources will be used in supplying the combined load. Power will be purchased by the pool at the increment cost to the company furnishing the power, and the decrement saving made by each company receiving the power will be paid to the pool.

From the decrement saving paid into the pool there will be deducted the cost of power furnished to the pool, fixed charges and maintenance on certain existing facilities which have been agreed to be necessary to effect the interchange and the salaries and expense of a small dispatching organization necessary for the opera-

tion of the pool. The resulting monthly savings will be distributed equally between the three members of the pool.

The Connecticut Power Company will act as accounting agent for the pool.

Approved to be effective as from July 1, 1936.

CONNECTICUT POWER COMPANY
By V. E. Bird Pres.

TURNERS FALLS POWER & ELECTRIC COMPANY
By George W. Lawrence President

NEW ENGLAND POWER COMPANY
By F. J. Dunn Vice President

[3484]

EXHIBIT 40.

Saturday, 8-24-35.

C.L.&P. received word to cut away at 8:52 A.M. (per RHB).

Mr. Day called me about 9 A.M. and said he had talked with Mr. Ferguson last evening at 9 P.M. at Fishers Island. Inasmuch as Mr. Ferguson was not ready to cut away at the state lines, he (Mr. Day) was ordering his men to cut the C.P.-New Britain tap. This work had already been started.

Mr. Applegate, Colvin, Whiting, Hunt, Mosher, McKearin and Corey, all these notified by Mr. Mayott.

Arranged to carry on Exchange between H.E.Lt. and T.F.P.&E.

About 10:30 A.M. Mr. Ferguson called stating that it would be necessary to cut the Hartford-Agawam line and the "E" line at the state lines.

Mr. Applegate was to call Mr. Ferguson and make arrangements with him as to cutting the lines.

Called Mr. Day and advised holding off the work on the New Britain tap. One line had already been cut.

Mr. Mosher notified. Mr. Whiting and Colvin notified. Called Corey at Millbury.

Called Poughkeepsie disp. and told them to get in touch with A.T. Gray and have him call me.
Corey called back to check on T.F. load.
Applegate to get in touch with Yale and make arrangements to cut the Agawam line. To have Yale wait for the O.K. from the Exchange.
Applegate told Colvin the "E" line was to be cut.
Hunt called at 11:40 A.M. He said Mr. Ferguson had talked with Mr. Lawrence. Mr. Mosher was arranging with Bell at N.E.P. to carry the T.F. load.
11:58 A.M. Talked with "Courant" reporter. Told him the names of the tie lines. Hartford, Conn. to Agawam, Mass. (The Hartford-Agawam Line) and from Falls Village, Conn. to Poughkeepsie, N.Y. (the "E" line). That the line with C.L.&P. at New Britain was open. The Conn. Power Co. owns the transmission lines. The H.E. Lt. owns no transmission lines. All other transmission lines (interstate) had been cut about a month ago. The tie between the N.E.P. and the Eastern Mass. and the Putnam, Willimantic and Rockville and other miscellaneous customers lines had been cut about a month ago. Didn't know about customers that were fed by out of state companies.
Reporter said Mr. Ferguson had told him to get in touch with Mr. Mayott.
[3485] Called Hunt, Applegate, Day and Gray.
Mr. Mosher said Mr. Ferguson said would be O.K. to cut away Sunday.
They are planning to cut away at 10 A.M. Sunday.
Tried to get Bell and found the office closed.
Tried to get Corey and found he was on his way home to lunch.
(J. C. Kennedy talked over W.E.A.F. and W.T.I.C. at 7:30 P.M. 8-23-35 on the Vicks Vapor Rub hour per F.L. Hunt)
12:16 P.M. Day. Told him Mr. Mosher had gotten in touch with me and said Mr. Ferguson had approved arrangements to cut away about 10:00 A.M. Sunday. Asked Mr. Day if they would

put the line back in service after the line is disconnected, if it would be back in service tomorrow.

The line had been ordered disconnected at New Britain. This is to countermand the order of a few minutes ago telling them to put the line back in service.

12:20 P.M. Applegate. Said O.K. for them to go ahead and cut the "E" line.

Got ahold of Gray in his office.

Mr. Applegate. Mr. Ferguson said O.K. to cut away Sunday at 10 A.M. Told him that Mr. Day is going to cut away and that he (Mr. Day) didn't think that cutting the loop was enough.

12:26 P.M. To Mosher. Told him O.K. to cut away tomorrow at 10 A.M. Told him that Mr. Applegate has talked with Mr. Ferguson and he says it is O.K. Told him that the loop is going to be opened at the state line. A dead span suspended on the Hartford-Agawam line and "E" line. Told him Mr. Day didn't think that opening the loop was enough and didn't constitute a physical disconnection at New Britain. Are going to cut away at New Britain anyway.

12:35 P.M. Mosher. Yale and he had arranged to cut the line at 10:30 A.M.

12:40 P.M. Day. C.L.&P. is going ahead and cut line at New Britain. Mr. Day doesn't agree that cutting loop constitutes actually disconnecting the line.

12:42 P.M., Applegate. Told him 10:30 A.M. Sunday instead of 10 A.M.

Reported that Yale and Mosher are standing by. That they will cut the Hartford-Agawam line. Take down the span. Make disconnection [*3486*] as soon as Applegate says that they are ready. Open loop on Indian Lake span. Yale and Mosher taking care of Hartford-Agawam line. Open loop and physically take span down.

12:50 P.M. Tried to get Gray.

12:50 P.M. To Poughkeepsie disp. Told him to get in touch with

Gray and see if Central Hudson would send linemen out to open the loop on Central Hudson side of Indian Lake span.
Gray called back and said they would do as requested as soon as he talked to Mr. Mac Guinness.
1:05 P.M. Applegate. Reported to him what had been done. He is to report back to Mr. Ferguson.
1:27 P.M. Whiting. Told him that arrangements with Gray had been made to open loop at the Indian Lake span. Told him we are standing by waiting for clearing on the "E" line.
1:30 P.M. Jobert. Said the disconnects opened at Smithfield and getting open on Falls Village side. Waiting to get clearing from Whiting's men.
1:30 P.M. Hartford disp. reported "E" line disconnects at Falls Village are open. That the disconnects on Falls Village side of Smithfield open and section between Falls Village and Smithfield grounded. C.P. line crew notified to proceed disconnecting lines at the state line.
6:20 P.M. "E" line cut out on Conn. side of Indian Lake.
6:00 P.M. Loop opened on C.H. side of the Indian Lake span.
Sunday, August 25, 1935.
9:57½ A.M. Hartford opened the Hartford-Agawam lines.
9:59 A.M. Agawam opened the Hartford-Agawam lines.
9:48 A.M. The C-3 Hartford-Agawam line opened. Grounded at 9:55 A.M. for Benson and Yale to remove span between towers 245 and 249.
10:00 A.M. D-4 Hartford-Agawam line opened. 10:02 A.M. grounded for Benson and Yale to remove span.
11:00 A.M. Tried to get I.W. Day but he was out. Left word to have him call when they got in touch with him.
1:19 P.M. Day called office and got Greene who reported to him that 4 spans of the Hartford-Agawam line were taken down and the "E" line had been opened at both sides of Indian Lake.

C. W. MAYOTT

[3487] Monday, August 26, 1935.

4:30 P.M. Called K.P. Applegate who notified me that the C.P. Co. was going to take down a span this side (Conn. side) of the Indian Lake crossing.

4:35 P.M. Tried to get I. W. Day but he had not gotten back from the Northern Conn. Co.

Tuesday, August 27, 1935.

9:07 A.M. Talked with F. Whiting. C.P. Co. line crew started from Canaan at 7 A.M. to take down the second span on the Conn. side of the Indian Lake crossing. Will take some 6 or 7 hours to do the whole job. Whiting is to send a man out to the job and have all three phases cut at the strain tower immediately.

9:15 A.M. I. W. Day called. Notified him what C. P. Co. was doing. He asked if the C.P. Co. lines could be cut out today, one at a time, long enough to reconnect. I to check with H. E. Lt. and call back. He to check with his organization as to their work.

9:20 A.M. Talked with Douglass. Told him of the above. He can cut out one line at a time when C. L. & P. wishes it. He to get man ready to do switching at 474, etc.

Called I. W. Day and told him the C. L. & P. could get the C. P. lines when they were ready. His men were all ready to work putting up the spans at New Britain. R. Hicock is to handle the C. L. & P. details from now on.

Notified Mr. S. Ferguson of above.

Notified Mr. K. P. Applegate of above.

9:40 A.M. Talked with R. Hicock. C. L. & P. can get one line back in service within 3 or 4 hours. He wanted to know which line H. E. Lt. would prefer first. Got D. Douglass on phone. He preference was No. 2 line. Told Hicock. The first line will be ready about 12:30 P.M. The second about 3 hours later. The C.P. lines will only be out while they are bolting back the loops on the special tower. All switching will go through the regular channels.

9:45 A.M. Told D. Douglass the above.
9:48 A.M. Notified K. P. Applegate that H. E. Lt. would probably be in parallel with C. L. & P. about 12:30 P.M.
10:20 A.M. Talked with F. Whiting and notified him as to what was being done. James Keenan will notify me from Lakeville as soon as the lines are all down.
Notified F. L. Hunt and A. T. Gray that C. L. & P. was reconnecting with the C. P. Co.
[3488] 11:50 A.M. Keenan reported from Lakeville that all three phases of the "E" line has been cut. The third span east of the Lake crossing was taken down (between towers 60 and 61).
Douglass and Hicock notified.
1:07 P.M. No. 2 C.P. line cut out so C.L.&P. could connect back in at New Britain.
2:59 P.M. No. 2 C.P. line cut back in and C.L. & P. phased with H.E. Lt. over this line.
Messrs. Applegate, Ferguson and Bird notified.
3:12 P.M. No. 1 C.P. line cut out to allow C.L.&P. to connect it back in at New Britain.
4:21 P.M. No. 1 C.P. line cut back in at all points including New Britain.
4:40 P.M. K. P. Applegate's office notified that No. 1 C.P. line was back in service.
4:52 P.M. Mr. S. Ferguson notified that No. 1 C.P. Co. line was back in service at New Britain.

Copy [3489]

EXHIBIT 41.

This Agreement made as of the first day of January 1931, by and between The Connecticut Power Company, a Connecticut Corporation with its principal office at Hartford, Connecticut, hereinafter called the Transportation Company, party of the first part, and The Hartford Electric Light Company and The Connecticut Light and Power Company, both Connecticut Corpora-

tions with their principal office at Hartford, Connecticut, hereinafter called the Power Companies, parties of the second part.
Witnesseth:

Whereas, the Transportation Company has built and owns a high tension transmission line running from East Hartford to Suffield, Connecticut (known as the Agawam Line) which line is used by the Power Companies for the purpose of exchanging power between themselves and others; and

Whereas, the use of said line by the Power Companies and/or subsidiaries results in their effecting material fuel savings as well as savings in plant investment; and

Whereas, said high tension line was constructed in order to make possible such savings.

Now, Therefore, in consideration of the premises and the covenants hereinafter set out, the party of the first part and the parties of the second part agree with each other as follows:

Article (I)

The Transportation Company agrees to transmit over said transmission line such amounts of electric energy as may be desired from time to time by the Power Companies up to the capacity of said line.

Article (II)

The Transportation Company agrees to operate said line in accordance [*3490*] with good practice and maintain same in good condition and repair.

Article (III)

The Transportation Company shall, upon request of the Power Companies and upon mutually satisfactory modification of the terms of this Agreement, increase the capacity of said line and make additional investments therein.

Article (IV)

No part of the right-of-way, structures, lines, transformers or substation facilities constituting the said high tension transmission line shall be used by the Transportation Company for purposes other than the exclusive service of the Power Companies,

unless the terms of this Agreement shall have been suitably modified by mutual consent.

Article (V)

The Power Companies agree as follows:

(a) To reimburse the Transportation Company for all taxes of whatever nature which the Transportation Company may be required to pay by reason of the ownership or operation of or business done over said line.

(b) To reimburse the Transportation Company for all expenses incurred in maintaining and operating said line, and for all repairs and replacements of same. There shall not be included in these expenses any item for depreciation, this being provided for under the amortization provisions effective upon the termination of this contract in Articles (VIII) and (IX).

(c) To reimburse the Transportation Company for all claims [*3491*] paid by said Company on account of damage to persons or property arising from the maintenance and operation of said line.

(d) To pay jointly the Transportation Company at the rate of $50,000 per year in lieu of participation in any savings that may be effected through the use of said transmission line. Said payment shall continue during the life of this contract, subject, however, to change under the terms of this agreement as contemplated in Articles (III), (IV) and/or (VIII) hereof.

The Power Companies shall each assume and be liable for only one-half of the payments and obligations due under this agreement to the Transportation Company, unless otherwise specifically provided for herein or modified by reason of the provisions hereof.

Article (VI)

Bills covering the items in Article (V) hereof shall be rendered by the Transportation Company as soon after the first of

each month as practical and will be due and payable on or before the fifteenth of the same month as rendered.

Article (VII)

It is agreed that the investment of the Transportation Company remaining in said line as of January 1, 1931, is Three Hundred and Ninety-three Thousand Seven Hundred and Fifty-six dollars and Twenty-three Cents ($393,756.23), after deducting the sum of One Hundred and Two Thousand Five Hundred and Seven Dollars and Fourteen Cents ($102,507.14) received by the Transportation Company to said date as amortization of its original investment at the rate of [3492] three per cent (3%) annually plus interest at five per cent (5%) compounded annually. The term "line investment" as used in this agreement shall be said sum of Three Hundred and Ninety-three Thousand Seven Hundred and Fifty-six Dollars and Twenty-three Cents ($393,756.23), plus the actual cost of additions and improvements to said line which may hereafter be made in accordance with Article (III) hereof, or less such amounts as may be mutually agreed upon in accordance with Article (IV) hereof.

Article (VIII)

This contract shall continue in force for a period of one (1) year from January 1st 1931 and shall continue thereafter from year to year without further action of the parties hereto, provided, however, either one of the Power Companies may withdraw and terminate this agreement in respect to itself at any time upon three (3) months' prior written notice to the other parties hereto.

Upon the termination or withdrawal from this agreement by either of the Power Companies there shall become due and payable to the Transportation Company by such withdrawing Power Company, either—

(a) If such withdrawal takes place prior to December 31, 1944, such sum as will at five per cent (5%) interest compounded annually, be equal on December 31, 1944, to one-

half of the line investment (as defined in Article (VII) hereof) less one-half of the estimated salvage value of the same; or

(b) If such withdrawal takes place subsequent to December 31, 1944, a sum equal to one-half of the line investment (as defined in Article (VII) hereof) less one-half of the estimated salvage value of the same.

[*3493*] Any Power Company which withdraws from this agreement according to the foregoing provisions at any time prior to the termination of this agreement by both of the Power Companies shall upon three (3) months' prior written notice to the other parties hereto become reinstated as a party hereto without further liability to the Transportation Company for the line investment, unless such line investment has subsequent to such withdrawal been increased pursuant to the provisions of Article (III) hereof, in which case the reinstated company shall be liable hereunder to the Transportation Company for one-half of such increase less one-half of the estimated salvage value of the same.

Article (IX)

This agreement shall be deemed terminated when both of the Power Companies have withdrawn therefrom. The Power Companies upon termination of this agreement shall reimburse the Transportation Company for its line investment (as defined in Article (VII) hereof) less the estimated salvage value of the same as determined by mutual agreement, unless such reimbursement has previously been made under the provisions of Article (VIII) hereof. Such reimbursement shall be made in lieu of any provision in this agreement for annual payments by the Power Companies to the Transportation Company to cover amortization of said line investment.

The Transportation Company shall upon termination of this agreement have the option of either dismantling said line or utilizing it for other purposes.

In the event that the Transportation Company uses said line

for other purposes after termination of this agreement, then the Transportation Company shall reimburse the Power Companies by one of the following methods, the method [3494] to be chosen to be solely at the option of the Transportation Company.

(a) A sum equal to the value of such line for such other purposes as may be determined by mutual agreement or arbitration which sum shall be in no event exceed the amount paid the Transportation Company by the Power Companies under the first paragraph of this Article; said sum to be divided between the Power Companies in proportion to their responsibility for said line investment under the provisions of this agreement; or

(b) Interest at the rate of seven per cent (7%) per year upon said sum. This payment of interest to continue so long as said line shall be used by the Transportation Company for such other purposes.

Article (X)

Arbitration

It is mutually agreed by the parties hereto that any controversy arising out of this contract shall be submitted to arbitration in accordance with the procedure hereinafter set out. This agreement to arbitrate shall apply whether the controversy or controversies shall be between any two parties or all three parties hereto.

The party desiring to arbitrate shall make a written request for arbitration to the other party or parties. Upon such request a single arbitrator may be selected by agreement of all the parties involved in the controversy. If within ten (10) days after date of such request the said parties have not agreed upon any one arbitrator, then the party requesting arbitration may request the Public Utilities Commission of the State of Connecticut to appoint two arbitrators and said arbitrators so appointed [3495] shall choose a third. In the event that the Public Utilities Commission aforesaid shall fail to appoint arbitrators, then the party requesting arbitration may proceed as provided in the statutes of the

State of Connecticut concerning arbitration of disputes. The expense of arbitration shall be borne equally by the parties involved in the arbitrated controversy. It is further mutually agreed that the law of Connecticut shall govern this contract in all respects.

Article (XI)

This agreement shall be binding upon and inure to the benefit of the respective successors and assigns of the parties hereto.

In Witness Whereof, the parties hereto have hereunto set their hands and seals acting by their respective officers thereunto duly authorized as of the day and year first above written.

THE CONNECTICUT POWER COMPANY,
Witness: By Allan D. Colvin Vice-Pres. (SEAL)
V. E. Bird

THE HARTFORD ELECTRIC LIGHT COMPANY,
By S. Ferguson Pres. (SEAL)
V. E. Bird

THE CONNECTICUT LIGHT AND POWER CO.,
By Irvin W. Day Vice President (SEAL)
C. L. Campbell

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* * * * * * [3498]

EXHIBIT 43.

Agreement made this 5th day of August 1930, by and between the Central Connecticut Power and Light Company, a Connecticut Corporation, hereinafter called the Buyer, and The Connecticut Power Company, a Connecticut Corporataion, hereinafter called the Seller,

Witnesseth:

Whereas, the Buyer supplies electric current for power and light to the towns of,—Portland (in part), Glastonbury, Marlboro, Hebron, East Hampton, Haddam, East Haddam, Colchester, and Salem, said territory being known as its northern division; and

Whereas, the Seller is also engaged in the manufacture and

distribution of electric current and supplies the same to other utilities.

Now, Therefore, in consideration of the premises and one (1) dollar in hand each paid to the other, receipt of which is hereby acknowledged, the parties hereto agree as follows:

(I) The Buyer agrees to buy and the Seller agrees to sell all the Buyer's requirements for electric current in its northern division as hereinabove described for the term of this contract, excepting such electric current as may be generated by the Buyer at its own hydro-electric power station located at Leesville in the Town of East Hampton, Connecticut, or as it may purchase from time to time from manufacturing plants which are its customers located in the aforesaid territory, as set out in paragraph (IX) hereof, providing nothing herein shall be construed as permitting the Buyer to buy electric current from any other source.

(II) The Buyer agrees to pay and the Seller agrees to sell such electric current at the following rate:

[3499]

(a) Demand Charge, payable monthly,

$2,100 per year for the first 50 K.W. of demand, or any part,

$24 per year per K.W. for any part of the next 100 K.W. of demand,

$15 per year per K.W. for excess demand;

plus (b) Energy Charge, payable monthly,

1 cent per K.W.hr. for any part of the first 180 hours use of demand,

.8 cent per K.W.hr. for excess use of demand.

Coal Adjustment: In the event that The Hartford Electric Light Company from which power is purchased by The Connecticut Power Company is obliged at any time to pay abnormal prices for coal on account of strikes or other reasons, the right is reserved to apply a fuel adjustment of not more than one mill per K.W.hr. for each dollar per ton of excess price paid.

Minimum Monthly Charge: The demand charge.

Method of Determining Demand: By suitable demand meter, to be located at point of delivery specified in paragraph (III) hereof, the interval being 30-minutes, except where indicated peak demands as determined by test exceed 150% of the 30-minute demand, in which case the demands obtained by test will apply. The demand billed in any month is the highest occurring during the elapsed twelve months. The Buyer may elect for an ensuing twelve months' period that the demand be billed on a monthly basis at an increase of 5% over the yearly demand prices stated above, in which case the demand billed in any month is the highest occurring in that month, subject to a minimum of either 80% of the highest demand occurring in the winter period (October 1st to March 31st, inclusive) of the last 12 months, or 50% of the highest demand occurring in the summer period (April 1st to September 30th, inclusive) whichever is the greater.

(III) The Seller agrees to deliver said electric current at Penfield Hill, Connecticut Power Company Pole No. 110, Portland, at a nominal voltage of approximately 13,600 volts and it is mutually agreed that said electric current shall be measured at that voltage. The energy supplied under this contract is to be three phase, sixty cycle alternating current.

(IV) The Buyer agrees to install a rotary condenser or other equivalent apparatus of suitable size to control its power factor; and further agrees to maintain during the term of this contract, [*3500*] or accept adjustment of demands thereto the following power factor on its system at all hours requested by the Seller:

80% for demands less that 500 K.W.
90% for demands of 500–2,000 K.W., and
95% for demands over 2,000 K.W.

(V) The Seller agrees at its own expense to reinforce its line from its aerial cable in Portland to Penfield Hill sufficient to carry 1500 K.W. at a nominal voltage of 13,600.

(VI) It is mutually agreed that if during the term of this con-

tract it should become desirable or necessary for the Seller to make additional investment in its transmission system for the purpose of supplying the requirements of the Buyer under this contract, the Seller shall not be required by this contract to make such investment unless satisfactory terms can be agreed upon as to sharing carrying charges and the amortization of such investment, provided nothing herein shall be construed as affecting paragraph (V) hereof.

(VII) It is mutually agreed that this contract shall be effective as of January 1st 1930 and that proper adjustments will be made retroactively for this purpose.

(VIII) It is mutually agreed that the term of this contract shall be for fifteen (15) years commencing from said January 1st 1930.

(IX) It is further mutually agreed that the Buyer may acquire further power, from manufacturing plants which are its customers in said territory by lease or purchase, provided any such lease or purchase which may affect the amount of current bought by the Buyer under this contract shall be subject to the reasonable approval of the Seller.

[*3501*] (X) It is mutually agreed that this contract shall be binding upon the successors and assigns of both parties.

In Witness Whereof, the parties hereto acting by their duly authorized officers have caused this contract to be signed in their respective corporate names and their seals affixed hereto the day and year first above written.

CENTRAL CONNECTICUT POWER AND LIGHT COMPANY,
By: Abner Reynolds Treasurer
Allins D Fiske President

Witness:
Earle L Pike
as to AA & ABL.

THE CONNECTICUT POWER COMPANY,
By: Allan D Colvin Vice Pres

Witness:
Grace Nelson

* * * * * * [3502]

EXHIBIT 44A.

THE HARTFORD ELECTRIC LIGHT CO.
266 Pearl Street Hartford, Conn.

Address your reply to the Company and refer to
S. Ferguson Chairman of the Board of Directors
V. E. Bird Pres. E. S. Nutting, Sec'y & Treas., K. P. Applegate, Gen. Mgr.

October 25, 1935

[Stamped: Federal Power Commission Oct 28 1935 Received]

Mr. Frank R. McNinch, Chairman, Federal Power Commission, Washington, D. C.

My dear Mr. McNinch,

Referring to your favor of October 12, and the offer of cooperation toward a restoration of the before-existing interconnections (which we greatly appreciate), would say that we believe all companies concerned would agree to a reconnection of their lines if the Commission would be willing to make an "interpretative" order, subject to revocation at pleasure, along the lines of the attached memorandum.

Such an order would cause all companies concerned, except the Connecticut Light & Power Company and the Hartford Electric Light Company, to become "public utilities", as defined in Section 201(b), and would avoid the economic loss which under present conditions would otherwise exist until a sufficient length of time has elapsed to reassure the directors of the Connecticut Light & Power Company and the Hartford Electric Light Company, both as to the interpretation to be placed on various sections of the Act, and as to the policies to be pursued in the carrying out of the same.

While it is of course uncertain that the courts would construe as "interstate commerce" the past practice of using and permitting the use of plants (without sales of product) not owned or controlled, whenever such use is in the interest of economy, we would

propose to concede the question as to the transfers at points D and E, in the event that the suggested "interpretative" order were to be issued.

Yours very truly,

S. FERGUSON,

S. Ferguson,
Chairman of the Board of Directors

SF:S Encls.

P.S. I should be glad to send a representative at your convenience to discuss any points in the attached memo., which may not be perfectly clear.

Noted BM H.D.J.

[3503] October 25, 1935

[Stamped: Federal Power Commission Oct 28 1935 Received]

Interpretative Order

1 - Power sold or bought by the Connecticut Power Company to or from the Central Hudson Gas & Electric Company at Point E, constitute interstate transactions.

2 - Power sold or bought by the Connecticut Power Company to or from the Turners Falls Power & Electric Company at Point D, constitute interstate transactions.

3 - Sales or purchases of power between intrastate corporations and municipalities at Points A, B, B1, C and F are intrastate transactions.

4 - The transmission lines of the Connecticut Power Company connecting Point A with D, and E with H, are included in the term "facilities" for interstate transmission of power, as used in Section 201(B).

5 - The transmission lines of the Turners Falls Power & Electric Company joining the lines of the Connecticut Power Company at Point D are included in the term "facilities" for interstate transmission of power as used in Section 201(B).

6 – The transmission lines of the Central Hudson Gas & Electric Company joining the lines of the Connecticut Power Company at Point E are included in the term "facilities" for interstate transmission of power as used in Section 201(B).

7 – The Connecticut Power Company, the Central Hudson Gas & Electric Company, the Turners Falls Power & Electric Company are "public utilities" as defined in the Act, since each owns "facilities" under the jurisdiction of the Federal Power Commission.

8 – Transmission lines (other than those specified in (4), (5) and (6)), connecting with Points A, B, B1, C, F and H, are not included in the term "facilities" for interstate transmission as used in Section 201(B).

9 – This interpretative order may at any time be revised or cancelled by the Federal Power Commission, provided the companies affected are given ten days' prior notice of such intent, during which ten-day period the companies affected may, if they so desire, restore their lines to the exclusively intrastate condition existing on August 26, 1935.

[3504] October 25, 1935

[Stamped: Federal Power Commission Oct 28 1935 Received]

Point A—Substation of the Hartford Electric Light Company

This substation of the Hartford Electric Light Company is an integral part of its power plant.

This substation has two functions—

1 – To deliver power generated by Hartford to the Connecticut Power Company. This power is eventually sold by the Connecticut Power Company according to its business necessities to customers both within and without the State.

2 – To receive power purchased from the Connecticut Power Company. The power so purchased may, according to the business necessities of the Connecticut Power Company, have been generated in its own plant or purchased (in

whole or in part) from other companies within or without the state.

Points B & B1—Substations of the Connecticut Light & Power Company

These are points of delivery for power sold by the Connecticut Light & Power Company to the Electric Department of the Town of Groton.

This power is eventually sold by Groton to its customers within the State. One of these customers (Fishers Island Farms) transmits the major portion, but not all of the power so purchased, to Fishers Island, New York.

Point C—Substation of the Connecticut Light & Power Company

This substation is used for two purposes—

1 – To deliver power generated by the plants of the Connecticut Light & Power to its local customers at New Britain, and to the Connecticut Power Company. This latter power is eventually sold by the Connecticut Power Company according to its business necessities, to customers both within and without the state.

and

2 – To receive and distribute within the state power purchased from the Connecticut Power Company, which power may, according to the business necessities of the Connecticut Power Company, have been generated either in its own plant or have been purchased (in whole or in part) from other companies within or without the state.

[*3505*] October 25, 1935

Point D

At this point on the State Line, the transmission line connecting the Connecticut Power Company with the Turners Falls Power & Electric Company, ends.

At this point power is transmitted both into and out of the State.

Point E

At this point on the State Line, the transmission line connecting the Connecticut Power Company with the Central Hudson Gas & Electric Company, ends.

At this point power is transmitted both into and out of the State.

Point F—Substation of Turners Falls Power & Electric Company

This substation is used for two purposes—

1 – To receive and deliver the power of the Turners Falls Power and Electric Company to the Agawam Electric Company, to the United Electric Company at Springfield and to the Connecticut Power Company at the State Line:—

and

2 – To receive and deliver power purchased from the Connecticut Power Company at the State Line to the Agawam Electric Company, to the United Electric Company at Springfield and to the lines of the Turners Falls Power & Electric Company.

Point H—Substation of the Connecticut Power Company

This substation is used for two purposes—

1 – Distribution of power generated at its plant to customers within and without the State.

and

2 – Distribution to customers within and without the State of power purchased within and without the State.

[NOTE: The last page of Exhibit 44-A is a map identical with the last page of Exhibit 47, p. 3561, printed 1113, *infra.*]

* * * * * * [3514]

EXHIBIT 44E.

THE HARTFORD ELECTRIC LIGHT CO.
266 Pearl Street Hartford, Conn.

Address Your Reply to the Company and Refer to
S. Ferguson Chairman of the Board of Directors
V. E. Bird, Pres. E. S. Nutting, Secy. & Treas.
K. P. Applegate, Gen. Mgr.

September 16, 1935

[Stamped: Federal Power Commission Sep 17 1935 Received]

Federal Power Commission Washington, D. C.

Gentlemen:

Acknowledging your order of September 11th, would advise that we have this day received the consent of the Connecticut Public Utilities Commission to our compliance with same as per attached copy.

Referring to your questions in order:—

1—What lines were discontinued?

a—The 66,000 volt lines of the Connecticut Power Company which had previously connected with the system of the Central Hudson Gas and Electric Company in New York State.

b—The 66,000 volt lines of the Connecticut Power Company which had previously connected with the system of the Western Massachusetts Companies in the state of Massachusetts.

2—At what points?

Wires cut and removed at both sides of state line crossings.

3—When?

New York crossing Saturday, August 24, 1935. Massachusetts crossing Sunday, August 25, 1935.

4—Between what companies were connections terminated?

As to physical connections, see No. 1.

As to exchange of power, Hartford Electric Light Company, Western Massachusetts Companies, Connecticut Light and Power Company, Central Hudson Gas & Electric Company, Niagara Hudson Company, New England Power Company and Boston Edison Company.

5—Where energy was being interchanged with other companies did such companies agree to severing connections?
Yes.

[*3515*] 6—Were you correctly quoted as saying that the interconnections discontinued had meant "savings to consumers of power amounting to between two millions and three million dollars"?
Yes. This is an under-estimate of what has been saved to consumers from exchange of power.

(Note: In some press reports the above saving was stated to be an "annual" saving which was not in accord with my statement)

Very truly yours

S. FERGUSON

S. Ferguson
Chairman of the Board

SF:d

[*3516*]

EXHIBIT 45.

THE HARTFORD ELECTRIC LIGHT COMPANY
Hartford, Connecticut

September 17, 1935

Mr. C. L. Campbell, Vice President, Connecticut Light & Power Company, 36 Pearl Street, Hartford, Conn.

Dear Mr. Campbell,

You will probably be interested in the attached correspondence.

also in the fact which I have learned today that the Niagara Hudson have cut their interstate lines.

Yours very truly,

S. FERGUSON,
Chairman of the Board

SF:S Encls.

Encls. Complete file

9/11 Fed. P.C. telegram to Mr. SF
9/13 SF telegram to S.F.
9/13 SF letter to Conn. P.U.C.
9/13 SF letter to F. R. McNinch FPC
9/14 Fed. P.C. telegram to Mr. S. F.
9/16 Conn. P.U. permission to SF
9/16 SF letter to F.P.C.
9/16 SF letter to Conn. P.U.C.

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* * * * * * [3557]

EXHIBIT 47.

Enclosures: 3 – page memorandum (Interstate & intrastate transactions)
1 – map of State of Conn. with transmission facilities therein.

November 19, 1935

Mr. J. Henry Roraback, President, Connecticut Light & Power Company, 36 Pearl Street, Hartford, Connecticut

Dear Mr. Roraback,

We have petitioned the State Commission for approval of the transfer from Hartford to the Connecticut Power Company of all transmission facilities between Hartford and the Massachusetts state line, such as river-crossing towers etc., as a step toward reconnecting the severed connections of the Connecticut Power Company.

It is our plan to later reconnect these lines and to stand on the

proposition that while such connection makes the Connecticut Power Company a "public utility" under the Act, that all transactions in the state between the Connecticut Power Company and other companies are intrastate transactions and do not bring such other companies under the definition.

We hope that you will see your way to take the same position, otherwise it will be necessary to again open the connection between our systems at New Britain prior to such reconnection.

We should be pleased to know of your decision in the matter at your early convenience.

In the event that you wish to separate our systems, the matter can perfectly well wait until the time of the December peak has passed.

Our reason for the above decision is that we believe that the chance of our position being overruled by the courts is too remote to justify the loss of $100,000 a year and the greater plant investment to be shortly required under the present operating conditions.

Attached please find map and memorandum indicating in detail what we believe to be a sound position and one which will be sustained by the courts.

Yours very truly,

S. FERGUSON,
Chairman of the Board

SF:S Encls.

[3558] November 19, 1935

MEMORANDUM – INTERSTATE AND INTRASTATE TRANSACTIONS

1 – Power sold or bought by the Connecticut Power Company to or from the Central Hudson Gas & Electric Company at Point E, constitute interstate transactions.

2 – Power sold or bought by the Connecticut Power Company to or from the Turners Falls Power & Electric Company at Point D, constitute interstate transactions.

3 – Sales or purchases of power within a single state between cor-

porations and/or municipalities of that state at Points A, B, B1, C and F are intrastate transactions.

4 – The transmission lines of the Connecticut Power Company connecting Point A with D, and E with H, are included in the term "facilities" for interstate transmission of power, as used in Section 201 (B).

5 – The transmission lines of the Turners Falls Power & Electric Company joining the lines of the Connecticut Power Company at Point D are included in the term "facilities" for interstate transmission of power as used in Section 201 (B).

6 – The transmission lines of the Central Hudson Gas & Electric Company joining the lines of the Connecticut Power Company at Point E are included in the term "facilities" for interstate transmission of power as used in Section 201 (B).

7 – The Connecticut Power Company, the Central Hudson Gas & Electric Company, the Turners Falls Power & Electric Company are "public utilities" as defined in the Act, since each owns "facilities" under the jurisdiction of the Federal Power Commission.

8 – Transmission lines (other than those specified in (4), (5) and (6)), connecting with Points A, B, B1, C, F and H, are not included in the term "facilities" for interstate transmission as used in Section 201 (B).

[3559] November 19, 1935

Point A—Substation of the Hartford Electric Light Company

This substation of the Hartford Electric Light Company is an integral part of its power plant.

This substation has two functions—

1 – To deliver power generated by Hartford to the Connecticut Power Company. This power is eventually sold by the Connecticut Power Company according to its business necessities to customers both within and without the State.

2 – To receive power purchased from the Connecticut Power

Company. The power so purchased may, according to the business necessities of the Connecticut Power Company, have been generated in its own plant or purchased (in whole or in part) from other companies within or without the state.

Points B & B1—Substations of the Connecticut Light & Power Company

These are points of delivery for power sold by the Connecticut Light & Power Company to the Electric Department of the Town of Groton.

This power is eventually sold by Groton to its customers within the State. One of these customers (Fishers Island Farms) transmits the major portion, but not all of the power so purchased, to Fishers Island, New York.

Point C—Substation of the Connecticut Light & Power Company

This substation is used for two purposes—

1 – To deliver power generated by the plants of the Connecticut Light & Power to its local customers at New Britain, and to the Connecticut Power Company. This latter power is eventually sold by the Connecticut Power Company according to its business necessities, to customers both within and without the state;

and

2 – To receive and distribute within the state power purchased from the Connecticut Power Company, which power may, according to the business necessities of the Connecticut Power Company, have been generated either in its own plant or have been purchased (in whole or in part) from other companies within or without the state.

[3560] Point D

At this point on the State Line, the transmission line connecting the Connecticut Power Company with the Turners Falls Power & Electric Company, ends.

At this point power is transmitted both into and out of the State.

Point E

At this point on the State Line, the transmission line connecting the Connecticut Power Company with the Central Hudson Gas & Electric Company, ends.

At this point power is transmitted both into and out of the State.

Point F—Substation of Turners Falls Power & Electric Company

This substation is used for two purposes—

1 – To receive and deliver the power of the Turners Falls Power and Electric Company to the Agawam Electric Company, to the United Electric Company at Springfield and to the Connecticut Power Company at the State Line:

and

2 – To receive and deliver power purchased from the Connecticut Power Company at the State Line to the Agawam Electric Company, to the United Electric Company at Springfield and to the lines of the Turners Falls Power & Electric Company.

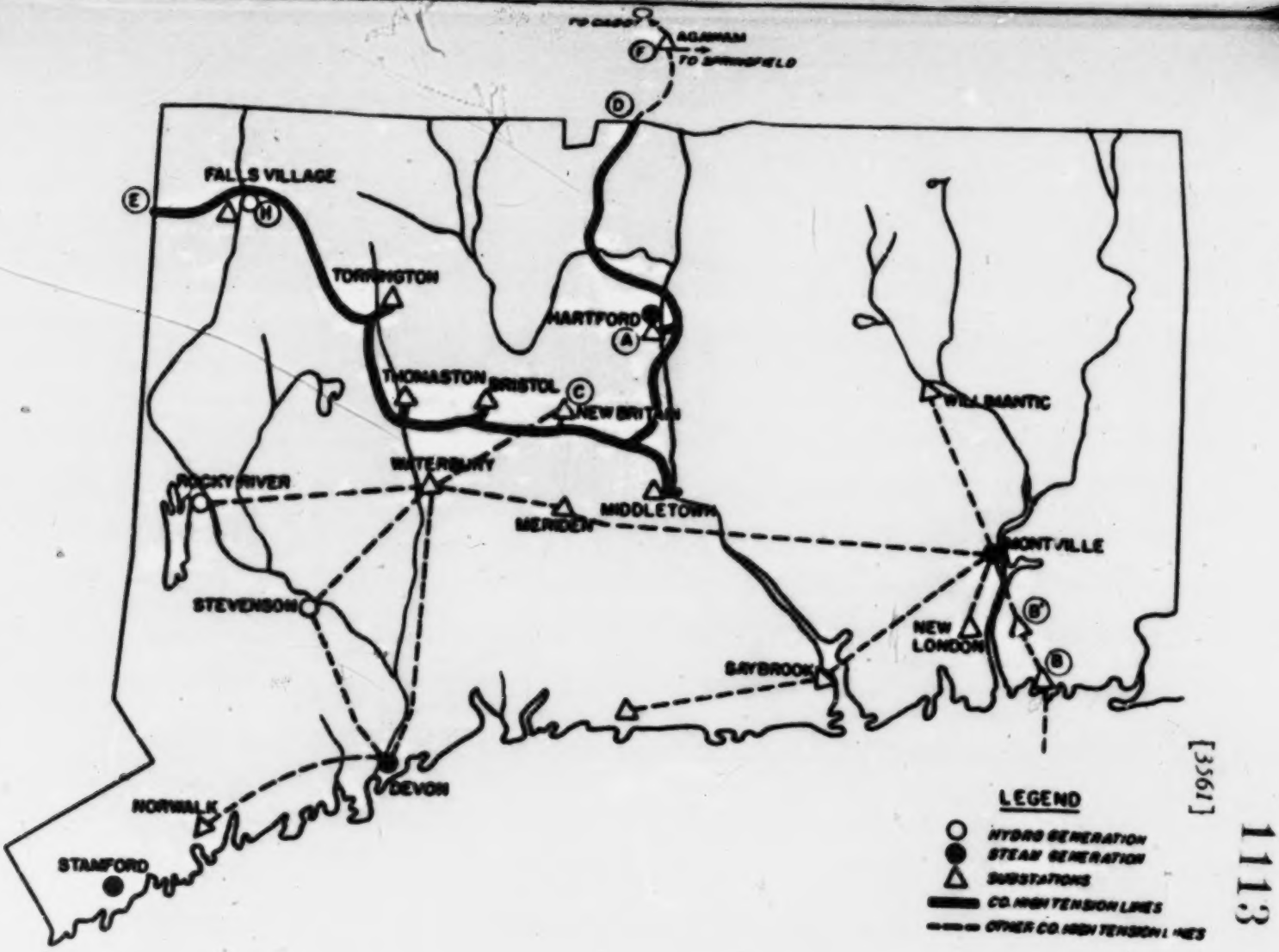
Point H—Substation of the Connecticut Power Company

This substation is used for two purposes—

1 – Distribution of power generated at its plant to customers within and without the State.

and

2 – Distribution to Customers within and without the State of power purchased within and without the State.


TO SPRINGFIELD
FALLS VILLAGE
TORRINGTON
HARTFORD
THOMASTON
BRISTOL
NEW BRITAIN
WILLIMANTIC
WATERBURY
ROCKY RIVER
MERIDEN
MIDDLETOWN
MONTVILLE
STEVENSON
NEW LONDON
BAYBROOK
DEVON
NORWALK
STAMFORD
LEGEND
HYDRO GENERATION
STEAM GENERATION
SUBSTATIONS
CO. HIGH TENSION LINES
OTHER CO. HIGH TENSION LINES

[3561]

EXHIBIT 48.

CARMODY & THOMS
Attorneys at Law
Lilley Building Waterbury Connecticut

Terence F Carmody
William E Thoms
William J Larkin Jr
Walter F Torrance
Maurice T Healey Jr

John D Thoms
Terence C Carmody
Edward T Carmody
Tax Counsel
Alfred C Frodel

Telephones
3 0107
3 0108
3 0109

November 29, 1935.

Mr. J. Henry Roraback, President, The Connecticut Light & Power Company, 36 Pearl Street, Hartford, Conn.

Dear Mr. Roraback:

I have looked over with much interest the letter of Mr. Ferguson, Chairman of the Board of The Hartford Electric Light Company, dated November 19, 1935, and the memorandum and map attached thereto and am glad to get the viewpoint of himself and his company in relation to the controversial questions discussed therein.

As I understand the situation from the engineering standpoint, both with relation to the Agawam line and the so-called Poughkeepsie line, connecting with the Central Hudson Gas & Electric Company, the situation is not so much one of the purchase and sale of power as it is the exchange of power, and that whether the current is received from or sent to New York or Massachusetts depends on varying sets of conditions which may change from day to day or, perhaps, from hour to hour.

As to the situation in relation to Groton, it does not seem to me that this has any bearing on the discussion, as there is no interchange of power, and my thought would be that it would be

better if the reference to Groton and the sale of power there to the local company was eliminated from the memorandum and the map for purposes of discussion of the problems involved.

While I certainly cannot speak with the authority of the Supreme Court, I am afraid that I cannot agree with all of the conclusions in Mr. Ferguson's letter and memorandum, and it seems to me that your company will assume quite a serious risk of coming under Federal jurisdiction if the Agawam and Falls Village connections are remade by the Connecticut Power Company unless your connection at New Britain is cut off.

The real question seems to be whether, under Part II of the Act, these activities described in Mr. Ferguson's [3563] letter are the transmission of electric energy in interstate commerce or the sale of electric energy at wholesale in interstate commerce and the salient point is where the transmission of energy in interstate commerce stops. Perhaps I cannot state the prevailing opinion better than it is stated on page 27 in the book on Operating & Economic Aspects of Public Utility Act of 1935, dated February 18, 1935, and published by the Committee of Public Utility Executives, 60 Broadway, N.Y. The references to Title are a little changed by subsequent changes in the bill, but the interesting part is this:

> "1. Companies are subject to jurisdiction of FPC under Title II if they own or operate (a) transmission facilities used in transmitting energy from a point within a state to a point outside of the state for sale outside of the state, (b) production facilities used in generating energy sold by the generating company or by another company outside of the state, (c) transmission or production facilities connected to the aforesaid transmission or production facilities 'as parts of a system of power transmission situated in more than one state'.
>
> "Apparently the 'power transmission system' is a physical system, irrespective of ownership. Hence it appears that all

companies are subject to Title I who own or operate any part of an interconnected system which extends over more than one state, irrespective of whether any energy generated or transmitted by its own facilities can be identified as going into another state, and irrespective of whether the companies actually transmitting energy over the state line are associated or affiliated companies.

"There is room for much difference of opinion as to what is a 'system of power transmission'. It may mean only that part of an interconnected system in which interstate flow can be identified, but probably the intended meaning would include all of an interconnected system which is so interconnected in normal operation that power could be relayed by substitution to another state. Likewise, it might be construed to include facilities and systems capable of interconnection for emergency or casual interchange but not regularly connected.

"In general it seems probable that most of the important transmission companies in the United States would become subject to FPC jurisdiction under the definition given, since most such systems are interconnected, directly or indirectly, with systems which cross state lines.

[3564] "2. Companies are not subject merely because they conduct retail distribution and sale of energy transmitted from another state, provided they own no transmission lines interconnected with the interstate transmission."

Of course, most of the Supreme Court cases in relation to such matters are gas cases, with relation to taxes and regulation of what was claimed to be transmission in interstate commerce. Perhaps the one which throws the most light upon the subject is Public Utilities Commission *v.* Attleboro, 273 U.S., 89. It seems to be the general tendency in the Courts to hold that interstate transmission ends at the transformer which uses it for the produc-

tion of low voltage currents for distribution in the state and that at that time, and not before, occurs the breaking up of the original package, no matter through whose hands it goes. In the light of the legal uncertainty and the risk of Federal control involved I cannot agree with all of the 8 points in Mr. Ferguson's memorandum. My views with relation to them are as follows:

1, 2, 4, 5, 6 and 7 are probably undisputed.

3 relates to sale, exchange or interchange of power at Agawam, Hartford and New Britain (I think Groton ought to be omitted). I cannot agree that, under all the circumstances, the sale, exchange or interchange of power at these points is certainly purely intra-state. There is a serious risk that it may be held otherwise, and, if it is, you are under the Act.

8. The same conclusions apply to 8 as to 3.

Very truly yours,

WET/B

W E THOMS

[3565]

EXHIBIT 49.

THE HARTFORD ELECTRIC LIGHT CO.
266 Pearl Street Hartford, Conn.

Viggo E. Bird President September 26, 1935

Mr. Irvin W. Day, Vice President The Connecticut Light and Power Company 111 West Main Street Waterbury, Conn.

Dear Mr. Day:

As you may know, we are contemplating transferring to The Connecticut Power Company those transmission lines which might be considered subject to the Federal Power Commission under a recent amendment to the Federal Water Power Act on account of interstate use. This brings up the question as to how much of said lines can be so classified. Our Counsel feels that any interstate character of the Agawam Line can be stopped at the Substation of the South Meadow Plant, and that on the New York line such classification can be stopped at Falls Village.

Insomuch as this is of importance to your company on account of our interconnections, might it not be possible to have a conference between your Counsel and ours in order to see if it can't be determined what lines should be placed with The Connecticut Power Company, so that that company will own all the transmission lines subject to the Federal Power Commission on account of interstate commerce? I suggest that Mr. Mayott sit in at such a conference so as to describe the physical conditions of the transmission system.

In respect to the appeal in the matter of Starquist et al versus The Hartford Electric Light Company, would you like to have your Counsel participate in an advisory capacity so that the procedure of the appeal may be satisfactory to them? This is a case of first impression, and the first appeal under the new statute. It is of importance to all of us that the proper procedure be established, and we feel that it is only proper to invite your cooperation and advice.

Sincerely yours,

V. E. BIRD,

V. E. Bird President

[3566]

EXHIBIT 50.

November 26, 1935

Mr. W. E. Thoms, Carmody & Thoms, Lilley Building, Waterbury, Connecticut.

Dear Mr. Thoms:

As you requested yesterday over the telephone, I am giving you brief outline of the connections of The Connecticut Power Company system with transmission lines extending outside the borders of the State, viz., the so-called Agawam line running into Massachusetts and the Poughkeepsie line running into New York. I am giving the explanation in very non-technical terms.

The Agawam line is built for 110,000 volts, but has been oper-

ated at 66,000 volts, which is the same voltage as is carried on the transmission lines of The Connecticut Power Company and of our own Company. The current coming from Massachusetts is metered as it comes into the plant of The Hartford Electric Light Company in Hartford, so you can picture the meters as the first piece of equipment at the Hartford end of the line. Next comes a so-called auto transformer, which is in effect a regulator. Next are the switches which connect [redacted] line to the system of the Connecticut Power Company, and through the transmission lines of the latter Company it passes New Britain and is there connected to the system of The Connecticut Light and Power Company.

The purpose of the auto transformer at Hartford is to raise or lower the voltage, both for receiving and for transmitting. To illustrate crudely, let us assume that the voltage at the Massachusetts end of the Agawam line is 66,000 volts, and that current is flowing from Massachusetts into Connecticut. It will be received at Hartford with some drop or loss. Let us therefore say that it is received at Hartford at 64,000 volts. Manifestly it must then be brought up to the level of the voltage of the lines of The Connecticut Power Company before it can be, so to speak, taken into that system and the auto transformer is used to raise the voltage from 64,000 to 66,000 volts.

On the other hand, let us assume that current is being sent out from Hartford to Massachusetts. In order that it may be received at Massachusetts at 66,000 volts it will be necessary to dispatch it from Hartford at a higher voltage, let us say 68,000 volts, and the auto transformer is used to accomplish this object.

[3567] There is also another thing to be said, viz., that this current is not, strictly speaking, purchased, but is exchanged, and from hour to hour the current is received from or sent to Massachusetts, depending on a rather complicated set of conditions in the various plants that are so interconnected.

A complicated set of what might be called double entry records or accounts are kept with each of the interconnected companies so

that from hour to hour each Company is debited or credited with the current sort out or received by it, both in terms of kilowatt hours and in dollar values, so that for example, The Connecticut Light and Power Company is debited and credited with blocks of current which it has received or sent out during the month, so that at the end of the month it has a net debit or credit.

Even the above is not a complete picture, because it is a case where in every instance, or almost in every instance, everyone in th pool makes a profit. This may seem a little confusing at first, but fix in your mind that the debits and credits in dollars are exchanged betwen the participants of the pool, but the bogey against which profits are figured is the estimated cost of what it would have cost each participant company if it had been generating its own current and had not been a participant in the pool operations. Thus the exchange of money between the pool participants is something concrete and tangible, while the profits are very real in one sense and imaginary in the other, in that they are figured against an imaginary set of conditions, viz., what it would have cost each Company had it been running alone and on its own.

If I have not made all this clear to you, let me repeat what I have said to others, that I think these pool operations are sufficient to drive any sane man crazy, and I do not believe anybody can understand them unless he is a little crazy anyway.

The Poughkeepsie line condition is a little simpler in that that is one between The Connecticut Power Company and the Poughkeepsie Company only, and although I am not clear whether they buy and sell or merely exchange, I understand, however, that it is an exchange as between the two Companies similar to the Agawam arrangement, but simpler to the extent that there are only two companies involved. The current is received and metered just before it reaches the Falls Village hydro plant, after which it mingles with the current of The Connecticut Power Company.

There is no intervening auto transformer at this point as in the case of the Agawam line.

Yours very truly

AJC:EBF ALEX J. CAMPBELL Special Engineer

P.S. It has been suggested that I should emphasize the fact that the power is not being exchanged at this time and also that I have used the word "savings" instead of "profits".

A J C

[3568]

EXHIBIT 51.

Mr. Day. Perkins, Cocking have copies given to Mr. Davis, Federal Trade Comm. 2/16/32 EKL.

This contract superceded by Contracts No. 5787 and No. 5788 HRB, 1/13/37 No. 4336

This Agreement made as of the first day of November 1930, by and between The Connecticut Power Company, hereinafter called the Power Company, and The Connecticut Light and Power Company, hereinafter called the Electric Company, both being corporations organized under and existing by virtue of the laws of the State of Connecticut,

Witnesseth:

Whereas, the Power Company entered into an Agreement with the Bristol and Plainville Tramway Company dated August 9, 1916 for the sale and purchase of electricity at Bristol, Connecticut, and an agreement dated March 24, 1917 for the operation of a condenser at said Bristol; and

Whereas, the Power Company entered into Agreements with The Eastern Connecticut Power Company for the purchase and sale of electricity at New London, Connecticut, dated March 27, 1920 and November 16, 1922; and

Whereas, The Bristol and Plainville Tramway Company and The Eastern Connecticut Power Company have been merged into

the Electric Company so that it is the successor in interest to said companies; and

Whereas, said agreements have been variously amended and modified from time to time and it is deemed advisable at this time to make a new agreement.

Now, Therefore, in consideration of the premises and for the sum of One (1) Dollar and other considerations each to the other paid, receipt of which is hereby acknowledged, and of the mutual covenants and agreements herein contained, the parties hereto covenant and agree with each other as follows:

Article I

The Power Company agrees to supply and the Electric Company agrees to take and pay for at Bristol, and the Electric Company agrees to supply and the Power Company agrees to take and pay for at New London, electric power as defined under and subject to the terms and conditions hereinafter set forth.

[3569] Article II

(a) Contract Demand

The initial contract demand hereunder of the Electric Company at Bristol shall be ten thousand (10,000) K.W. subject, however, to reduction as hereinafter set out.

The initial contract demand of the Power Company at New London shall be six thousand (6,000) K.W. or the highest actual demand in any month occurring during the last elapsed twelve (12) months if such actual demand is higher or lower than six thousand (6,000) K.W.

The method of determining the demand shall be by demand meter, the interval being thirty (30) minutes.

It is agreed that as the contract demand of the Power Company hereunder shall increase at New London over and above six thousand (6,000) K.W., the contract demand of the Electric Company at Bristol shall be decreased by a similar amount, such adjustment to be made annually as of November 1st.

(b) Rate

The rate shall be the demand charge plus the energy charge.

The demand charge shall be $18.00 per year per K.W. of contract demand, payable in equal monthly installments whether or not any current is used.

The energy charge shall be four (4) mills per Kw-hr. for all current delivered at New London and all contract current delivered at Bristol.

Article III

The Electric Company agrees to take at Bristol initially thirty million (30,000,000) Kw-hrs. per year (in approximately equal monthly installments) and proportionately less as the contract demand at Bristol is reduced below ten thousand (10,000) K.W. Such number of Kw-hrs. is herein referred to as the contract current delivered at Bristol.

Inasmuch as the electric power supplied hereunder at Bristol by the Power Company and the electric power supplied hereunder at Bristol by the Electric Company will be so intermingled as to make it [*3570*] impossible to meter the same separately, it is mutually agreed that, of the total Kw-hrs. supplied at Bristol in any month, that portion up to the monthly installment of contract current shall be considered as having been supplied by the Power Company and any Kw-hrs. in excess of said portion as well as any demand in excess of the contract demand shall be considered as having been supplied by the Electric Company.

For purposes of identification, the monthly installment of contract current shall be the first two and one-half million (2,500,000) Kw-hrs. used by the Electric Company at Bristol and proportionately less as the contract demand varies from time to time.

The Power Company agrees to supply said contract current at Bristol in the monthly installments specified.

The Power Company agrees to take at New London its entire requirements of electric power in its New London division and the Electric Company agrees to supply the same.

Article IV

Delivering and Metering

(a) All electric power furnished hereunder by the Power Company at Bristol shall be delivered at a normal primary voltage of sixty-six thousand (66,000) volts and shall be alternating, three (3) phase current at a frequency of approximately sixty (60) cycles per second. All such current shall be delivered to the Electric Company at the substation of the Electric Company in Bristol, Connecticut, and shall be measured on the high tension side of the Electric Company's transformers located in said substation.

(b) All electric power furnished hereunder by the Electric Company shall be delivered at a normal primary voltage of thirty-three thousand (33,000) volts and shall be alternating, three (3) phase current at a frequency of approximately sixty (60) cycles per second. Such current shall be delivered to the Power Company at the Williams Street Substation of the Power Company in New London, Connecticut, and at such other points as shall be mutually agreed upon, and shall be measured on the high tension side of the Power Company's transformers located at such points of delivery.

[3571] (c) Voltage regulation and power factor shall be governed by day to day operating understandings between the Power Company and the Electric Company. In case of failure to agree with respect to the voltage, it shall at the point of delivery be not less than sixty thousand (60,000) volts at Bristol and not less than thirty thousand (30,000) volts at New London, respectively. In case of failure to agree with respect to the power factor, the receiving company shall maintain for such reasonable load period or periods as the supplying company may from time to time request, a power factor of not less than eighty (80) per cent lagging.

(d) Metering shall be done by suitable metering equipment and such equipment shall be subject to inspection by either company at all times upon reasonable notice. The metering equipment at

Bristol shall be installed and owned by the Electric Company, and the metering equipment for measuring the supply to the Power Company shall be installed and owned by the Power Company. Any testing and calibration necessary shall be done by the company owning the equipment and the expense of same shall be borne equally by the two companies.

(e) Each company shall furnish to the other a quality of service, including voltage regulation, frequency and interruptions, which shall compare favorably with similar service furnished elsewhere by other companies where accepted good practice prevails.

Article V

Billing

Each company shall on or about the first day of each month render to the other company a bill for the services furnished as herein provided for during the previous month and payment for such bill shall be made on or before the fifteenth day of such month.

Article VI

Line Reconstruction

The Power Company agrees to rebuild at its expense its tap line from Bristol Junction into Bristol and make such changes in the line [*3572*] between New Britain and Bristol as may be necessary, in both cases, in the joint judgment of the engineers of the two companies, to safeguard the service at Bristol.

The Electric Company agrees at its expense to make such changes in its lines from Montville to New London as will, in the joint judgment of the engineers of the two companies, safeguard the service at New London.

Article VII

It is mutually agreed that in the event the amount of electric current to be transported by the Power Company for the Electric Company over the Power Company's lines between New Britain and Bristol over and above the contract amount becomes a burden on the Power Company's ability to take care of its own business

over said lines, which matter shall be in the sole but reasonable judgment of the engineers of the Power Company, then the Electric Company shall build its own line from Frost Bridge, so-called, to Bristol or to Thomaston, or shall otherwise remedy the condition within one (1) year after written notice from the Power Company.

Article VIII

(a) The Electric Company shall have the right to purchase from the Power Company and the Power Company agrees to sell to the Electric Company the tap line from Bristol Junction to Bristol referred to in Article VI hereof including the right of way for same either within ninety (90) days after the termination of this agreement or in the event that the Electric Company builds its own line to Bristol as provided for in Article VII hereof.

The price to be paid for said tap line and right of way shall be $62,125.00 (the present book value of said tap line and right of way, plus the cost of additions and betterments made to said tap line and right of way subsequent to November 1, 1930, less depreciation at the rate of $806.90 per year for the period between November 1, 1930 and the date of such purchase.

It is understood and agreed that, in the event the Electric Company purchases said tap line and right of way prior to the termination of this [3573] agreement, it may become desirable or necessary to change the place of delivery of the electricity furnished hereunder by the Power Company and to make other modifications in the provisions of this agreement in order to adjust equitably for the new conditions of supply, but such modifications shall not be construed as changing the method of determining the amount of primary power to be supplied by the Power Company or the rate to be paid for same by the Electric Company.

(b) The Electric Company owns a right of way from Cohanzie Junction to the Williams Street Substation of the Power Company at New London together with two transmission lines built thereon, one a double circuit line over which electric power is supplied to the Power Company, the other a single circuit line.

The Power Company shall have the right to purchase from the Electric Company and the Electric Company agrees to sell to the Power Company within ninety (90) days after the termination of this agreement said two circuit transmission line of the Electric Company from Cohanzie Junction to New London including the right of way; provided, however, that the Electric Company may, in conveying said right of way to the Power Company, reserve the right to use said right of way jointly with the Power Company for its single circuit transmission line or any substitute therefor in order that the Electric Company may fulfill any obligations it may have for the supply of electric power to The Connecticut Company, its successors and assigns at New London.

The price to be paid for said line and right of way shall be $31,382.00 (the present book value of said line and right of way) plus the cost of additions and betterments made to said line and right of way subsequent to November 1, 1930, less depreciation at the rate of two per cent per annum on the cost of such additions and betterments.

Article IX

The contracts specified in the preambles of this agreement are hereby terminated as of October 31, 1930, and it is mutually understood and agreed that this agreement succeeds and takes the place of all prior agreements, promises or understandings, expressed or implied, relating to the supply of power by the Power Company to the Electric Company at Bristol and by the Electric Company to the Power Company at New London.

[*3574*] Article X

The Power Company further agrees to transport over said lines from New Britain to Bristol such other electric power with suitable allowance for line losses as may be supplied by the Electric Company for use in Bristol over and above that bought hereunder from the Power Company, up to the capacity of said lines as rebuilt and subject to Article VII hereof.

In consideration of rebuilding said lines and as a transportation fee, the Electric Company agrees to pay the Power Company the

sum of four thousand (4,000) dollars per annum (in equal monthly installments) during the term of this contract; provided, however, that in the event the Electric Company purchases the Power Company's tap line from Bristol Junction into Bristol as provided in Article VIII hereof, the Electric Company shall be relieved of further payment of said annual sum of $4,000.00.

Article XI

Arbitration

In case of any dispute arising as to the interpretation of this contract or any portion thereof or as to the adjustment of any claim, or as to any other matter hereunder, it shall be a condition precedent to the bringing of any action, suit or proceeding, whether at law or in equity, concerning such dispute, that the same shall first be referred for decision to an arbitrator, or in case at the end of ten (10) days after a request by any party for an arbitrator, the parties have not agreed upon a single arbitrator, to three (3) arbitrators, one appointed by the Electric Company, one by the Power Company, and the third by the two thus named. In case either the Electric Company or the Power Company shall fail to name a second arbitrator within ten (10) days after the naming of the first arbitrator, the first arbitrator shall be the sole arbitrator. In case of a failure by the two arbitrators to name a third arbitrator within ten (10) days after the appointment of the second arbitrator, the party requesting the arbitration shall within ten (10) days request any court which would have jurisdiction of a suit concerning the matter in dispute to name, and such court may thereupon name, the third arbitrator within fourteen (14) days thereafter. The three arbitrators, however named, may act by a majority; and the arbitrator or arbitrators, as the case may be, shall forthwith hear the parties after notice to the Electric [*3575*] Company and to the Power Company, shall consider and decide the dispute, and shall at once notify the Electric Company and the Power Company in writing of their decision. Such decision shall be binding upon the parties, and the expenses of the arbitration

proceedings shall be borne equally by the Electric Company and the Power Company.

Article XII

Successors and Assigns

The successors and assigns of the parties hereto shall be entitled to the rights and benefits of and shall be bound by this Agreement; but no assignment of the rights of either party shall be valid without the consent in writing of the other. A consolidation or merger of either party with another corporation or the placing of a general mortgage by either party upon its property shall not be construed as an assignment within the meaning of this paragraph.

Article XIII

Term

This agreement shall be binding upon the parties hereto until February 17, 1943.

In Witness Whereof, the Power Company and the Electric Company have caused this instrument to be executed in duplicate by their proper officers thereto duly authorized and their respective corporate seals to be hereto affixed as of the day and year first above written.

THE CONNECTICUT POWER COMPANY

By S. Ferguson Pres

THE CONNECTICUT LIGHT AND POWER COMPANY

By Irvin W Day Vice Pres.

Winesses for both signatures
V. E. Bird
Leland D Colvin

[3576] STATE OF CONNECTICUT,

COUNTY OF HARTFORD. ss. November 3, 1930.

Personally Appeared S. Ferguson Prest of The Connecticut Power Company signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of The Connecticut Power Company, before me.

JOHN E LYNER

Notary Public.

STATE OF CONNECTICUT,
COUNTY OF HARTFORD. ss. November 3, 1930.

Personally Appeared Irvin W Day Vice Pres of The Connecticut Light and Power Company signer and sealer of the foregoing instrument and acknowledged the same to be his free act and deed and the free act and deed of The Connecticut Light and Power Company, before me.

O. M. C. LYNES
Notary Public.

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* * * * * * [3597]

EXHIBIT 56.

CARMODY & THOMS
Attorneys at Law
Lilley Building Waterbury Connecticut

Terence F Carmody
William E Thoms
William J Larkin Jr
Walter F Torrance
Maurice T Healey Jr

John D Thoms
Terence C Carmody
Edward T Carmody
Guerin B Carmody

Tax Counsel
Alfred C Frodel

Telephones
5 0107
5 0108
5 0109

April 16, 1936.

Mr. Irvin W. Day, The Connecticut Light & Power Company,
Waterbury, Conn.

Dear Sir:

We have your letter of April 13th, in relation to the Hartford-Agawam transmission line which was reconnected on March 18, 1936, as a result of the emergency created by flood conditions on the Connecticut River.

On reading carefully Title II, Part II, Section 202d of the Public Utility Act of 1935, you will note that companies may, without coming under the jurisdiction of the Commission, during

the continuance of any emergency, construct temporary facilities for the transmission of energy in interstate commerce necessary or appropriate to meet such emergency and that the temporary connection shall be discontinued upon the termination of such emergency.

What you say about the interchange of power for economical reasons, as long as the connection is maintained, may have some merit from the financial standpoint and it is true that the paragraph in question does not restrict, in explicit terms, the use of such power furnished through the temporary connection to its use for emergency purposes, nevertheless, to use it for other purposes would seem to be in contradiction to the whole spirit and purpose of the act. It is difficult to see why your company, which has no such emergency, could properly participate in an exchange of power, by which you received energy which you did not require on account of an emergency, as far as you were concerned. Such is not the purpose of this exception to the jurisdiction of the act.

Our rather earnest conviction is that this connection should be utilized only for the furnishing of such power by your company as is necessary to the Hartford Company or the Western Massachusetts Company to meet the emergency, and not for any other purpose. Our reaction, from the legal standpoint, is [3598] strongly against any other use of such connection. The exception does not seem to have any other reasonable interpretation, in view of the general purpose of the act.

Very truly yours,

CARMODY & THOMS

By W E Thoms

WET/B

EXHIBIT 57.

CARMODY & THOMS
Attorneys at Law
Lilley Building Waterbury Connecticut

Terence F Carmody
William E Thoms
William J Larkin Jr
Walter F Torrance
Maurice T Healey Jr

John D Thoms
Terence C Carmody
Edward T Carmody
Guerin B Carmody

Tax Counsel
Alfred C Frodel

Telephones
3 0107
3 0108
3 0109

May 27, 1936.

The Connecticut Light and Power Company, 36 Pearl Street, Hartford, Connecticut.

Gentlemen:

You will recall that Section 1414 (c) of the Public Acts, Supplement of 1935, in its first sentence sets forth as the purpose of the section, the preservation of the full power in the State to regulate its public service corporations, to increase the powers of the public utilities commission, and to promote local control of Connecticut public service corporations, and that this Act of 1935 shall be construed to effectuate these purposes. The question that comes up just now is whether the State Commission has the right and power to forbid any company organized under the laws of this State and doing business herein, from making such connections for the purchase or interchange of power with companies in other states as will bring such company within the jurisdiction of the Federal Power Commission under the provisions of Title II Part II of the Federal Public Utility Act of 1935.

Under sub-title (b) of Section 1414 (c) of the State 1935 Act, above cited, the State Commission has very broad powers and may order such changes in the manner of operation as may be necessary

in the public interest. It certainly is in the public interest as construed under (a) of the same section to promote and keep control of Connecticut corporations within the jurisdiction of the State of Connecticut and it clearly would seem as though the Commission had the right and power to order a cessation of an interstate exchange of power which will certainly lead to the divesting of State control and the attaching of Federal jurisdiction, if continued beyond any emergency period. Furthermore, any such exchange of power has to be by contract, express or implied, and the Commission has the power to look into the provisions of such contracts, and, if by reason of their being disadvantageous to citizens of this State, because of their subjecting the operation and rates of the whole [*3600*] system to the expense connected with Federal jurisdiction, probably it has power to disapprove such contracts and forbid the exchange of power thereunder.

Connecticut public utility corporations are chartered for the purpose of service to the people of Connecticut and not for the purpose of subjecting themselves to Federal jurisdiction and thus depriving the people of this State of their control, and we think the State, through the Public Utilities Commission, has the power to restrict the operations of such companies to service within the State. Whether or not this might be true of individuals is another question, but as to chartered public utility companies, given special privileges by the State, the right seems pretty clear.

If anything else occurs to you we will be glad to discuss it with you.

Yours truly,

CARMODY & THOMS

WET:G By W E Thoms

* * * * * * [3646]

EXHIBIT 64.

DAYS HAVING HOURS WHEN FALLS VILLAGE GENERATION WAS LESS THAN THE DELIVERIES TO CENTRAL HUDSON GAS & ELECTRIC CORPORATION AND SIMULTANEOUSLY MASSACHUSETTS ENERGY WAS RECEIVED AT SOUTH MEADOW SUBSTATION

January 11, 1937	April 18, 1937	May 26, 1937
January 16, 1937	April 19, 1937	May 28, 1937
January 17, 1937	April 20, 1937	May 30, 1937
January 18, 1937	April 21, 1937	May 31, 1937
January 22, 1937	April 22, 1937	June 1, 1937
January 23, 1937	April 23, 1937	June 13, 1937
January 24, 1937	April 24, 1937	June 14, 1937
January 25, 1937	April 25, 1937	June 20, 1937
January 26, 1937	April 26, 1937	June 21, 1937
January 27, 1937	April 27, 1937	June 23, 1937
January 28, 1937	April 28, 1937	June 24, 1937
January 30, 1937	May 1, 1937	June 25, 1937
January 31, 1937	May 2, 1937	July 3, 1937
February 20, 1937	May 3, 1937	July 4, 1937
February 22, 1937	May 5, 1937	July 5, 1937
February 23, 1937	May 6, 1937	April 10, 1938
February 24, 1937	May 8, 1937	April 11, 1938
February 25, 1937	May 9, 1937	May 16, 1938
February 26, 1937	May 10, 1937	July 3, 1938
February 27, 1937	May 15, 1937	July 24, 1938
February 28, 1937	May 19, 1937	July 25, 1938
March 7, 1937	May 20, 1937	July 30, 1938
April 8, 1937	May 21, 1937	July 31, 1938
April 10, 1937	May 22, 1937	August 1, 1938
April 15, 1937	May 24, 1937	August 2, 1938
April 17, 1937	May 25, 1937	August 3, 1938

December 9, 1938
December 10, 1938
December 11, 1938
December 13, 1938
March 27, 1939
March 28, 1939
April 2, 1939
April 3, 1939
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April 15, 1941
April 20, 1941
April 21, 1941
April 26, 1941
April 27, 1941
May 26, 1941

EXHIBIT 65.

DAYS HAVING HOURS WHEN FALLS VILLAGE GENERATION WAS ZERO AND SIMULTANEOUSLY MASSACHUSETTS ENERGY WAS RECEIVED AT SOUTH MEADOW SUBSTATION

February 3, 1937	December 14, 1937	May 5, 1938
March 5, 1937	December 15, 1937	May 6, 1938
March 20, 1937	January 3, 1938	May 9, 1938
March 21, 1937	January 9, 1938	May 10, 1938
May 11, 1937	January 10, 1938	May 13, 1938
May 12, 1937	January 11, 1938	May 14, 1938
May 13, 1937	January 20, 1938	May 15, 1938
May 16, 1937	January 26, 1938	May 17, 1938
June 1, 1937	January 27, 1938	May 24, 1938
June 7, 1937	January 28, 1938	May 25, 1938
June 14, 1937	January 29, 1938	May 30, 1938
June 15, 1937	January 31, 1938	July 18, 1938
June 29, 1937	February 1, 1938	August 22, 1938
July 11, 1937	February 2, 1938	August 23, 1938
July 12, 1937	February 9, 1938	August 25, 1938
August 2, 1937	February 19, 1938	August 27, 1938
August 5, 1937	February 25, 1938	August 29, 1938
August 10, 1937	February 28, 1938	August 30, 1938
August 19, 1937	March 1, 1938	September 6, 1938
August 24, 1937	March 4, 1938	September 7, 1938
August 25, 1937	April 4, 1938	November 7, 1938
September 4, 1937	April 5, 1938	November 13, 1938
September 27, 1937	April 6, 1938	November 19, 1938
October 11, 1937	April 27, 1938	November 25, 1938
November 11, 1937	April 28, 1938	November 26, 1938
November 22, 1937	April 29, 1938	November 28, 1938
November 24, 1937	April 30, 1938	November 30, 1938
November 27, 1937	May 2, 1938	December 2, 1938
December 12, 1937	May 3, 1938	December 27, 1938
December 13, 1937	May 4, 1938	January 1, 1939

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November 5, 1940
December 19, 1940
February 23, 1941
April 23, 1941
April 27, 1941
April 28, 1941
April 29, 1941
April 30, 1941
May 1, 1941
May 8, 1941
May 24, 1941
May 26, 1941

[3650]

EXHIBIT 66.

OFFICE MEMORANDUM.

Form 445

To R. H. Knowlton, Vice President — Date June 21, 1935

At Hartford, Connecticut

Subject

To make our deliveries to the Borough of Groton absolutely clear under the terms of the contract, I think I will have to refer you to the attached very rough sketch, and then call your attention to the wording in paragraph 3, on page 2, of our contract with the Borough, emphasizing the words "at the above mentioned substation of the Power Company at Trail's Corner in the Town of Groton; the end of its existing 33,000 volt transmission line at Groton Long Point and such other points as may be mutually agreed upon."

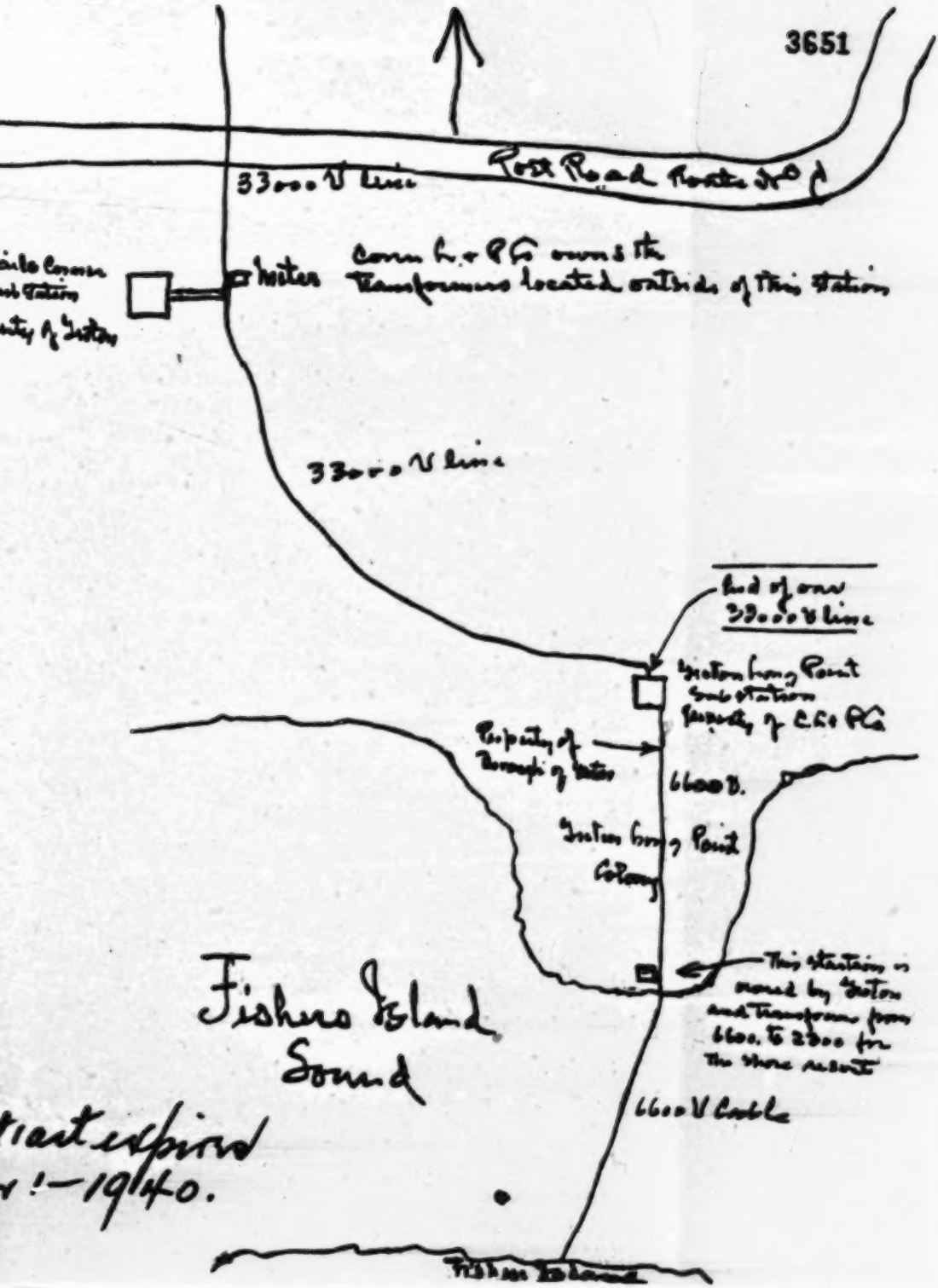
Our deliveries now are at two points, the substation owned by the Borough of Groton near Trail's Corner, so-called, and at the high tension side of the transformers at Groton Long Point. There is but one metering point; namely, on the line just outside of the Trail's Corner station. The transformers in this station, reducing the voltage from 33,000 to 2,300 volts, are our property while all the rest of the station is owned by the Borough. The 33,000 volt transmission line from Trail's Corner to Groton Long Point, and the Groton Long Point substation, is owned by us.

These three items, representing an investment of $30,210.00, are leased to the Borough; that is, they pay us 11 per cent on the investment and they are devoted wholly to their uses. At the Groton Long Point substation the voltage is transformed to 6600 volts, and from this point a single circuit to the extreme south end of Groton Long Point and the cable delivers the energy to Fisher's Island at 6600 volts. This line is tapped at the point of contact between the distribution system and the cable to take care of local service.

It seems to me that this takes care of us for the delivery is definitely in the contract, and in point of fact is "the end of its existing 33,000 volt transmission line at Groton Long Point."

R W PERKINS
Vice President.

3651



...tract expires
...r 1-1940.

[3652]

EXHIBIT 67.

May 16, 1939

Mr. W. C. Allen, Division Plant Superintendent Western Union Telegraph Company 60 Hudson Street New York City

Columbia-Colchester Line

Dear Sir:–

The Connecticut Light & Power Company is constructing a 22,000 volt transmission line from its existing substation at Columbia to its existing substation at Colchester. Your facilities will be crossed at one point as shown on the photostat copy of map attached.

We are also sending you one print of our drawing No. 9065-A showing construction at the crossing, which will be in accordance with Public Utilities Docket No. 5700.

The Company is also planning to raise the voltage on the existing East Hampton-Leesville Line from 13,800 to 22,000 volts. This line crosses your facilities on the Airline branch of the railroad at two points as shown on the enclosed map. The insulation at these crossings will be equivalent to the new construction on the Columbia-Colchester line.

Will you kindly notify us, in duplicate, at your earliest convenience whether or not you have any objection to our proposed construction where your facilities are involved.

Yours very truly,

C. T. H.

C. T. HUGHES

Attachment OJZ:S General Superintendent

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* * * * * * [3665]

EXHIBIT 75.

Copy September 6th, 1935

MEMORANDUM *re* BOROUGH OF GROTON

Our contract with the Borough of Groton dated March 31st, 1930, for a period of 10 years and thereafter until cancelled by 12 months notice, contains the following provisions:

We are to deliver energy at Trail's Corner, Groton Long Point, and at such other points as may be mutually agreed upon. The delivery points are the low tension terminals of the transformers at Trail's Corner at the end of our 33 KV line at Groton Long Point and such other points as may be mutually agreed upon.

Energy is to be metered on the high tension side of the transformers at each point of delivery.

At Trail's Corner we own the land upon which the transmission line and transformers are erected, and also the lines, transformers and metering equipment.

We also own a 100 KVA feeder regulator which is inside the brick substation building at that location owned by the Borough of Groton.

At Groton Long Point substation, we own the land on which the substation is erected, together with the transformers, substation and metering equipment, but do not own anything beyond the confines of this substation lot.

The Borough of Groton pays us an 11% annual investment charge on $30,210.12 covering the transformers and substation equipment which we own at Trail's Corner and at the Groton Long Point substation, and also our investment in the second transmission circuit from the Chicken Farm to the Groton Long Point substation.

On October 31st, 1933, the Borough of Groton, through its Superintendent, requested that energy delivered to them be measured through one meter. Due to uncertainties which at that time existed in regard to the use of the transmission lines beyond Trail's Corner, it was not possible to promptly comply with this request. We did, however, make the change requested, and, beginning June 11th, 1935, we began metering their entire load at 33,000 volts at one point at the Trail's Corner substation, and have since that time billed them accordingly. Since June 11th, 1935, therefore, we have had two delivery points as before, one at the low tension terminals of the transformers at Trail's Corner, and the other at the terminals of our transmission lines at the

Groton Long Point substation, with a single metering point at 33 KV at Trail's Corner.

The transformers at the Groton Long Point substation step down from 33,000 to 6600 volts, and from the low tension side of these transformers the Borough of Groton has run a 6600 volt circuit to Groton Long Point. This circuit is for the most part overhead, but goes underground for the last 400 ft. approximately. This [3666] underground enters a small brick substation building which the Borough owns located near the shore at Groton Long Point. Just outside of this building, three 50 K V A 6600 to 2300 volt transformers supply the Borough's Groton Long Point load. A 2300 volt feeder and street lighting circuits extend a part of the distance back toward the Groton Long Point substation on the poles which also carry the 6600 volt overhead circuit. In the Borough's substation building, the Borough has made connection with submarine cables. The 6600 volt circuit, extending south from the Groton Long Point substation, therefore, supplies both the submarine cables and the Borough's Groton Long Point distribution. All of this 6600 volt and 2300 volt line and equipment belongs to the Borough of Groton.

The accompanying sketch may serve to more clearly show how this layout is arranged.

H. D. LARRABEE

Operating Superintendent.

[NOTE: The sketch map attached to Exhibit 75 and referred to therein is not printed—copies will be made available by counsel for the use of the Court.]

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* * * * * * [3668]

EXHIBIT 76.

May 29, 1940

Mr. R. H. Knowlton, Executive Vice President Hartford

Attached please find original letter from Day, Berry & Howard to Mr. Campbell, relative to the Borough of Groton matter, which Mr. Campbell asked to be returned to his office.

Mr. Larrabee and I met Mr. Tiffany and Mr. White at the Savings Bank in New London this morning and discussed the matter of a new contract, and told them of the advice that we had received from counsel. At first they felt that the contract could be so written by Mr. Day that it would cover the point which he brought up and even suggested a three-party contract. Fortunately Mr. Nathan Belcher, who is a prominent citizen of New London and a large property owner in Groton, happened to be in the bank, and since he was a lawyer and interested in matters pertaining to Groton, Mr. White asked him to come in. He introduced Mr. Belcher as Judge and stated the situation in what both Mr. Larrabee and I thought was a very satisfactory manner, and Judge Belcher was very helpful, as he advised them that it looked as if the Fishers Island load would have to be given up if they wished to renew the contract with us. Prior to this both Mr. White and Mr. Tiffany indicated a strong desire to retain the business and suggested that they could get the service from the Narragansett people or else they could buy from the Electric Boat or generate their own power. Mr. Tiffany finally admitted, however, that there was not much profit in the Fishers Island business, at which time I pointed out that a considerable amount of money could be saved by serving Groton Long Point at 2300 volts instead of a higher voltage, which would be necessary with the Fishers Island load.

The matter was left that we would submit within two weeks a proposed new contract for the supply of service to the Borough of Groton, with the understanding that if they continued to do business with us they would request the Fishers Island people to provide their own source of supply at the earliest possible moment. Judge Belcher, recommended this, stating that upon the presentation of this proposal the Borough could then consider whether they wanted to deal with the Narragansett company, make their own power or buy from the Electric Boat.

Fortunately Mr. White suggested that no publicity be given to this matter, particularly as affecting the Fishers Island load. Just

how closely Mr. Tiffany will follow this I do not know as he had mentioned earlier that he had made previous reports periodically to the Utilities Commission and the Federal Power Commission that they were supplying power to Fishers Island and that the supplying company had not "acted ugly'" about trying to get them to give it up. In the early part of the conversation he intimated that he might have to write [3669] the Federal Power Commission or take the matter up with the state Utilities Commission.

Both Mr. Larrabee and I felt that the meeting was very satisfactory and productive of good. Whether the matter will be handled as it was suggested by Mr. White and Judge Belcher I do not know.

I am preparing a proposed contract for the supply of service to the Borough for sale and use entirely within the limits of their chartered territory and will review the matter with you before presenting it.

A. V. S. LINDSLEY
Vice President

AVSL/ek Attach.

CC—Mr. H. D. Larrabee, Division Manager—Willimantic

[3670]

EXHIBIT 77.

DAY, BERRY & HOWARD
Counsellors at Law
750 Main Street

Edward M. Day
Joseph F. Berry
Lawrence A. Howard
James W. Carpenter
Allan K. Smith
Cyril Coleman
Julius G. Day, Jr.
Olcott D. Smith
Charles S. House
Austin D. Barney
Ralph C. Dixon
Richard F. Berry
Russell W. Viering
William E. C. Bulkeley

Hartford, Connecticut Trust
Company Building
Hartford, Connecticut

May 28, 1940

C. L. Campbell, President Connecticut Light & Power Co. Hartford, Connecticut

Dear Mr. Campbell:

I have been considering the matter of the contract between the Connecticut Light and Power Company and the Borough of Groton. The present contract bears the date, March 31, 1930, and was to be effective from April 1, 1930 until April 1, 1940 and thereafter until terminated by one year's notice. As I understand it, notice of cancellation was served on the Borough of Groton on September 27, 1939 and becomes effective on September 29, 1940.

We have talked, as you remember, somewhat about possible renewal of this contract. I think I ought to call your attention to the fact that the Borough of Groton was incorporated by a special act of the General Assembly of the State of Connecticut approved June 1, 1933. The territorial limits of the Borough of Groton are clearly set forth in this act, and the borough is given corporate authority to provide a water supply for its inhabitants and also to

produce, generate, and manufacture gas and electricity and to sell it to the inhabitants of the borough.

[*3671*] Borough of Groton

It is my opinion that the Borough of Groton has no authority to buy electricity from you and sell it outside of the territorial limits of the borough. And in doing so it involves the Connecticut Light & Power Company in what might possibly be considered an ultra vires act. Whatever may have happened in the past, it is my opinion that in any renewal of this contract, provision should be made to avoid any possible direct or indirect condition of this kind.

Very truly yours,

emd:vpb EDWARD M. DAY.

[*3672*]

EXHIBIT 78.

December 5, 1935.

Mr. W. Rodman Peabody, Peabody, Brown, Rowley & Storey, 201 Devonshire Street, Boston, Massachusetts.

Dear Br. Peabody:

Many thanks for yours of the 4th.

We agree with your opinion but unfortunately the Connecticut Light & Power counsel advise them that there is serious danger of all transmission lines connecting with those of the Connecticut Power Company being adjudicated as facilities under the control of the Commission—based on the unbroken package theory of the Attleboro Case and some natural gas cases. Therefore they refuse to take the risk, and urge us to remain connected to them rather than to Turners Falls.

We are therefore in the position of having, at this time, to make a permanent choice as to whom we shall play with; that is to say it is permanent so long as the Act stands if we elect to reconnect with Turners Falls because once under the Commission control we cannot change our minds and get out—but of course not permanent if we make the other election.

The logical and economic way to serve the Connecticut Valley is for the tidewater base load stations to supplement the water powers of the valley as we have been doing in the past, and therefore quite independent of our past pleasant relations, our choice in this dilemma is to reconnect.

Another difficulty with reconnection is that it makes uncertain the Connecticut Power Company exemption under Title I, and to be safe it will be necessary to merge our subsidiary companies into the Connecticut Power Company and thus become exempt under Section 3(a)(2) instead of depending on the definitions to be accorded to the words "predominately" and "substantially" in Section 3 (a) (1). This question does not arise in your case but does for the Connecticut Power Company by reason of its becoming the re-sale agent of the relatively large volume of exchange power. [3673] In view of the seriousness of the decision to us, and the known desires of the New England Power Company to cut us out, would you not consider some kind of a "favored nation" term contract between our companies to be appropriate. I don't mean anything specific as to detail but simply (other things being equal) that you will play with us in preference to New England. I know that is the intent of the present officers but personnel is liable to change in the course of ten or fifteen years.

Yours very truly,

S. FERGUSON,

Chairman of the Board.

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* * * * * * [3680]

EXHIBIT 85.

Memorandum showing number of hours in Exhibits 64 & 65 during which Falls Village generation was zero and simultaneously Massachusetts energy was received at South Meadows Substation, or when Falls Village generation was less than the deliveries to Central Hudson Gas & Electric Corporation, and simul-

taneously, Massachusetts energy was received at the South Meadows Substation on Mr. Miller's theory.

Year	No. of days listed in Ex. 64 & 65	No. of Hours fulfilling above conditions	Total No. of hours in period covered	%
1941	25	139	3,624	3.73
1940	52	251	8,784	2.74
1939	75	400	8,760	4.57
1938	72	282	8,760	3.22
1937	97	614	8,760	7.01
	321	1,676	38,688	4.33

[3681]

EXHIBIT 86.

LARGEST AMOUNT OF DEMAND DURING SINGLE MONTHS PURCHASED BY THE CONNECTICUT LIGHT AND POWER COMPANY FROM THE TORRINGTON ELECTRIC LIGHT COMPANY FOR WINSTED DISTRICT.

	1937	1938	1939	1940	1941
January	864	1,104	1,312	1,760	1,728
February	976	864	1,264	1,712	1,560
March	1,008	800	992	1,536	1,584
April	864	864	848	1,280	1,440
May	880	880	1,088	1,200	1,584
June	1,056	1,024	1,216	1,424	1,344
July	1,008	1,140	1,264	1,552	
August	1,152	1,282	1,488	1,632	
September	1,312	1,216	1,600	1,584	
October	1,376	1,376	1,776	1,608	
November	1,152	1,184	1,856	1,776	
December	1,136	1,280	1,952	1,536	

7/25/41

[3682]

EXHIBIT 87.

LARGEST AMOUNT OF DEMAND DURING SINGLE MONTHS PURCHASED BY CONNECTICUT LIGHT & POWER CO. FROM CONNECTICUT POWER CO. FOR THE EAST HAMPTON DISTRICT.

	1937	1938	1939
January	537.6	931.2	1,200
February	517.2	993.6	1,056
March	604.8	700.8	1,056
April	696	758.4	1,008
May	576	782.4	1,056
June	883.2	1,046.4	1,017.6 (Final)
July	1,027.2	1,027.2	
August	1,176	1,176	
September	1,032.8	1,084.8	
October	1,113.6	1,180.8	
November	931.2	1,324.8	
December	915.84	1,200	
7/25/41			

* * * * * * [3684]

EXHIBIT 90.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS.

UNIFORM SYSTEM OF ACCOUNTS FOR ELECTRIC UTILITIES

Prepared and submitted by the Committee on Statistics and Accounts of Public Utility Companies of the National Association of Railroad and Utilities Commissioners at its 1936 Annual Convention held in Atlantic City, N. J., November 10–13, 1936. The Convention adopted the following Resolutions:

"Whereas, The Committee on Statistics and Accounts of Public Utility Companies, after extended study and many conferences, has submitted proposed systems of accounts for gas and electric utilities; and

"Whereas, This Association believes that uniformity in utility accounting is most desirable in the public interest:

"Resolved, That the systems of accounts contained in the reports of said Committee be recommended to the Commissions represented in the membership of this Association for consideration, and for adoption in their respective jurisdictions, with such modifications only as they may deem necessary in the public interest."

[3685] 16. Transmission and Distribution Plant.

For the purpose of this system of accounts:

A. "Transmission system" means: (1) all land, conversion structures, and equipment employed at a primary source of supply (i.e., generating station, or point of receipt in the case of purchased power) to change the voltage or frequency of electric energy for the purpose of its more efficient or convenient transmission; (2) all land, structures, lines, switching and conversion stations, high tension apparatus, and their control and protective equipment between a generating or receiving point and the entrance to a distribution center or wholesale point, and (3) all lines and equipment whose primary purpose is to augment, integrate or tie together the sources of power supply.

B. "Distribution system" means all land, structures, conversion equipment, lines, line transformers, and other facilities employed between the primary source of supply (i.e., generating station, or point of receipt in the case of purchased power) and of delivery to customers, which are not includible in transmission system, as defined in paragraph A, whether or not such land, structures and facilities are operated as part of a transmission system or as part of a distribution system.

Note.—Stations which change the energy from transmission to distribution voltage shall be classified as distribution stations.

C. Where poles or towers support both transmission and distribution conductors, the poles, towers, anchors, guys, and right of way shall be classified as transmission system. The conductors, cross arms, braces, grounds, tie-wire, insulators, etc., shall be classi-

fied as transmission or distribution facilities, according to the purpose for which used.

D. Where underground conduit contains both transmission and distribution conductors, the underground conduit and right of way shall be classified as distribution system. The conductors shall be classified as transmission or distribution facilities according to the purpose for which used.

E. Land (other than right of way) and structures used jointly for transmission and distribution purposes shall be classified as transmission or distribution according to the major use thereof.

* * * * * * [3729]

BEFORE THE
FEDERAL POWER COMMISSION.
Docket No. IT-5665.

In the Matter of
CONNECTICUT LIGHT & POWER COMPANY.

PETITION FOR REHEARING AND STAY OF ORDER.

Now comes the Connecticut Light & Power Company, Respondent in the above entitled cause, and makes application by petition to the Honorable Commission for a rehearing on the Commission's Order entered on May 15, 1942, and on its Opinion No. 75, which was incorporated into and made a part of said Order, and respectfully represents that the Respondent is aggrieved by the aforementioned Order and Opinion, adopted by the Commission, containing its findings of fact and conclusions therefrom, and brings this petition under the provisions of Section 313(a) of the Federal Power Act. The Respondent is aggrieved in particular by the aforementioned order requiring it to comply with Order No. 42 mentioned therein, Order of May 11, 1937, and other orders supplemental to said Order No. 42, and to comply with the accounting requirements prescribed thereby applicable to public utilities within the meaning of that term as used in [3730] the Act as of the effective dates of such Orders, and to file within ninety days from the date of said Order of May 15, 1942, the data and information required by Electric Plant Accounts Instruction 2-D of the Uniform System of Accounts, and the aforesaid Order of May 11, 1937.

[Here follow those extracts from the petition for rehearing which are printed on pages 7–27 of this Appendix, together with certain matter which is omitted therefrom. These pages are numbered 3730–3750, inclusive, in the record filed in this Court.]

* * * * * * [3751]

The Respondent also specifies in this petition various rulings made in the course of the proceedings by the Trial Examiner, which rulings appear to have been adopted by the Commission. In support of this application, it relies upon the following errors of this kind, and contends that the Commission erred in so far as it approved, adopted or failed to reverse the following rulings of the Trial Examiner, to all of which exceptions were duly taken (as appears by the general arrangement appearing at pp. 44–45, 227 and 490 of the official stenographer's report of the proceedings).

[Here follow those extracts from the petition for rehearing which are printed on pages 28–33 of this Appendix.]

* * * * * * [3764]

The Respondent hereby makes application that the rehearing herein asked for be held at some date after the conclusion of the present war in which the United States of America is engaged and that said Order entered on May 15, 1942, be stayed pending decision after rehearing and for a reasonable time thereafter, and as reasons for said application the Respondent says:

(1) That the Order of May 15, 1942, is premised upon Opinion No. 75 of the Commission, which opinion raises questions of general importance and widespread application, and that such matters should be considered by the Commission upon the application for rehearing:

(2) That the Public Utilities Commission of the State of Connecticut has ordered a reclassification of accounts for electric and gas utilities, which reclassification requires the particular utility to show the cost to it and the original cost of its electric or gas utility plants, and such reclassification results in a system of accounts similar to the classification of accounts of the Federal Power Commission;

(3) That in order to comply with the reclassification of accounts provided for by the Public Utilities Commission of Con-

necticut, Respondent requested the independent engineering firm of Day & Zimmerman, Inc., of Philadelphia, Pennsylvania, to make a survey and estimate of the personnel and cost necessary to reclassify the plant accounts of Respondent on an original cost basis. The report of Day & Zimmermann, Inc. recommends that Respondent, in [3765] order to reclassify its accounts, employ, or provide from its personnel, a special group of accountants, engineers, clerks and typists (approximately 70 persons) for a period of eighteen months, at a cost of $350,000.00.

(4) That in view of the war emergency, to undertake such studies at the present time is not possible because of lack of sufficient personnel, or the possibility of obtaining from outside sources such personnel; that even if it were practicable to obtain seventy persons to do the work at the present time, that could be done only by taking people away from work more directly concerned with the war, and that it seemed better, therefore, to postpone this job until after the war is over, when there may be some unemployment and this job would help to furnish employment to people who otherwise might not be able to obtain employment.

(5) That on February 2, 1942, the Public Utilities Commission of the State of Connecticut granted Respondent's request that the undertaking of its reclassification of accounts be deferred in the following language:

> "In view of the war emergency and the possibility that the energy and attention of the officers and employees of the company may be needed for war purposes more acutely than in compliance with the orders of the Commission as to accounting, the Commission is unwilling to assume the responsibility in this case of substituting its judgment for that of the management to the degree of insisting upon immediate compliance. The request of the company is therefore granted for a period of one year."

[3766] (6) On February 2, 1943, when the present extension of time to undertake this job will have expired, if conditions re-

main substantially as they are at present, the Respondent expects that it will be necessary for it to apply to the Public Utilities Commission of Connecticut for a further extension of time until the end of the war, and it believes that the Public Utilities Commission, recognizing the conditions, will grant such an extension.

(7) The Respondent is an electric utility company whose personnel and plant are now largely devoted to the maintenance of an abundant supply of electric energy necessary for the successful prosecution of the war in which the United States is now engaged. The Respondent serves 65% of the territory of the State of Connecticut, and 41% of the state's population. A recent survey made by the Respondent indicates that it is serving 280 customers who are directly engaged in war production work, and that for the year 1942, 45% of the Respondent's entire sales of electricity, amounting to 408,000,000 kilowatt hours, or a kilowatt load of more than 57,000 kilowatts, will be to companies engaged directly in war production work. The personnel of the Respondent is also actively engaged, at the order of the War Production Board, in an effort to coordinate its facilities with those of other companies, both utility and industrial, in New England, to the end that an adequate and proper supply of electricity may be available for all of the industries in New England engaged in the war effort. As set forth above, a large portion of the [3767] Respondent's total sales of electric energy, including sales to other utilities, is devoted to war production. In addition, Respondent is also engaged in supplying gas and water services in certain communities throughout Connecticut to persons and industries engaged in war work. Also, the demand upon Respondent to supply electric energy for essential services, such as hospitals, pumping stations, sewage disposal plants, state armories, state highway departments, schools, police stations, etc.—services intimately connected with public health and safety—has been materially increased. Not only has the Respondent been subject to load increase demands because of war conditions, but also the requirements of war production have placed upon its personnel

heavy demands. The character of the work done by the Respondent at the present time is indicated by the high priorities granted the Respondent in connection with new facilities which it is in the process of installing to take care of capacity deficiencies occasioned by the war load. Such increases in the load on Respondent's system result from the large number of load increases from industries hitherto converted to war production, and it is estimated that new manufacturing facilities devoted entirely to war production will increase in the future, resulting in still further demands upon the Respondent.

(8) That enforced compliance with the Commission's Order of May 15, 1942, pending the determination of the application for rehearing, or within a reasonable period thereafter, would cause undue and unnecessary hardship on the Respondent.

[3768] That Respondent has not been furnished a copy of the Trial Examiner's report made upon the hearing held in the above entitled cause.

WHEREFORE on the grounds hereinbefore set forth the Respondent respectfully prays:

(a) That this Honorable Commission grant a rehearing in these proceedings to be held after the conclusion of the present war in which the United States of America is engaged;

(b) That upon such rehearing, this Honorable Commission make each of the findings and rulings herein requested;

(c) That upon such rehearing, this Honorable Commission adopt an order vacating, setting aside, and annulling the Order of the Commission entered on May 15, 1942, and its Opinion No. 75, which was incorporated into and made a part of said Order herein complained of;

(d) That pending the disposition of this petition, all further proceedings in this cause be stayed and suspended;

(e) That said Order be stayed until decision after rehearing and for a reasonable time thereafter, or for such other time as may be proper and reasonable under all the circumstances;

(f) That a copy of the Trial Examiner's report in the above entitled cause be furnished to or access thereto granted the Respondent.

[*3769*] (g) That this Honorable Commission grant such other and further relief as may be appropriate in the premises.

THE CONNECTICUT LIGHT AND POWER COMPANY, [CORP.]
By ROBERT H. KNOWLTON, [SEAL]
Executive Vice-President,
36 Pearl Street, Hartford, Connecticut.

CLAUDE BRANCH of
CHOATE, HALL & STEWART,
30 State Street, Boston, Massachusetts,
and
LAWRENCE A. HOWARD, and
OLCOTT D. SMITH of
DAY, BERRY & HOWARD,
750 Main Street, Hartford Connecticut,
Attorneys for Petitioner.

STATE OF CONNECTICUT,
COUNTY OF HARTFORD.

The undersigned, being first duly sworn, states that he is Executive-Vice President of The Connecticut Light and Power Company, the Petitioner in the foregoing petition; that he has read the petition and knows the contents thereof; that all of the statements contained therein are true and correct to the best of his knowledge and belief.

ROBERT H. KNOWLTON
Executive Vice-President.

Subscribed and sworn to before me, a Notary Public in and for said County and State, this 12th day of June, 1942.

MARY M. WALSH,
Notary Public.
[NOTARIAL SEAL]

[*3770*] CERTIFICATE OF SERVICE

I hereby certify that service of the foregoing Petition was made upon Howard E. Wahrenbrock, Counsel for the Federal Power Commission, on June 13th, 1942, by delivering a copy thereof to Leon M. Fuquay, Secretary of the Federal Power Commission, addressed to the said Howard E. Wahrenbrock.

s/ JOHN L. CURRY.

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[fol. 1169] Wednesday, December 8th, A. D., 1944

Before Honorable Justin Miller, Associate Justice, Honorable Armistead M. Dobie, Circuit Judge, sitting by designation, and Honorable Thurman Arnold, Associate Justice.

Proclamation being made the Court is opened.

No. 8341

THE CONNECTICUT LIGHT & POWER COMPANY, Petitioner,

vs.

FEDERAL POWER COMMISSION, Respondent

Argument commenced by Mr. Claude R. Branch, attorney for petitioner, continued by Mr. Howard E. Wahrenbrock, attorney for respondent, and concluded by Mr. Claude R. Branch, attorney for petitioner.

[fol. 1170] [Stamp:] United States Court of Appeals for the District of Columbia. Filed Feb. 28, 1944. Joseph W. Stewart, Clerk.

UNITED STATES COURT OF APPEALS, DISTRICT OF COLUMBIA

No. 8341

THE CONNECTICUT LIGHT & POWER COMPANY, Petitioner,

vs.

FEDERAL POWER COMMISSION, Respondent

Petition for Review of Order of the Federal Power Commission

Argued December 8, 1943 Decided February 28, 1944

Mr. Claude R. Branch, for petitioner. *Mr. John L. Hall* also entered an appearance for petitioner.

Mr. Howard E. Wahrenbrock, Assistant General Counsel, with whom *Messrs. Charles V. Shannon*, General Counsel,

and *Louis W. McKernan*, Principal Attorney, all of the Federal Power Commission, were on the brief, for respondent.

Before Miller, Dobie,* and Arnold, JJ.

ARNOLD, *Associate Justice:*

The Federal Power Commission after extensive hearings found that the petitioner, The Connecticut Light and Power Company, was a public utility within the meaning of the Federal Power Act, and ordered it to comply with the uniform system of accounts prescribed by the Commission under Section 301 of the Act. The case is before us for a review of the finding and order of the Commission. Since it is conceded that the petitioner must comply with the order if it is a public utility under the Act, the sole question before us is whether the finding of the Commission to that effect is sustained by substantial evidence and by a correct interpretation of the law.[1]

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* Sitting by assignment of the Chief Justice of the United States, pursuant to the provisions of the Act of December 29, 1942, entitled "An Act to amend the Judicial Code to authorize the Chief Justice of the United States to assign circuit judges to temporary duty in circuits other than their own."

[1] Statutes Involved.

Federal Power Act, 49 Stat. 847, U. S. C. Title 16, § 824(a).

Part II—Regulation of Electric Utility Companies Engaged in Interstate Commerce.

Declaration of Policy; Application of Part; Definitions.

Section 201. (a) It is hereby declared that the business of transmitting and selling electric energy for ultimate distribution to the public is affected with a public interest, and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following and of that part of such business which consists of the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce is necessary in the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.

[fol. 1171] The Connecticut Light and Power Company distributes electricity to a substantial part of the State of Connecticut, including 107 towns, cities and boroughs with a total population of 660,000, and about 130,000 additional consumers served by other Connecticut utilities which purchase electric current from the petitioner. On the Saturday before the Monday on which the Act took effect petitioner

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(b) The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a State line. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

(c) For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States.

(d) The term "sale of electric energy at wholesale" when used in this Part means a sale of electric energy to any person for resale.

(e) The term "public utility" when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part.

* * * * * * *

Federal Power Act, 49 Stat. 854, U. S. C. Title 16, § 825 (a)

Part III—Licenses and Public Utilities; Procedural and Administrative Provisions.

[fol. 1172] was unquestionably engaged in the interstate transmission of electric energy as defined by the Act. It was a member of the Connecticut Valley Power Exchange for the interchange of electric energy between companies in Massachusetts, Connecticut and New York. Its facilities were designed so that this interchange of energy created substantial savings and constituted the most efficient use of the system. In a last minute effort to avoid Federal jurisdiction the petitioner severed its main interstate connection in spite of the fact that this added to the cost of furnishing electricity to consumers in Connecticut. It was, however, unable to sever all its interstate connections and it is on these remaining connections that the government rests its case.

Accounts, Records, and Memoranda.

Section 301. (a) Every licensee and public utility shall make, keep, and preserve for such periods, such accounts, records of cost-accounting procedures, correspondence, memoranda, papers, books, and other records as the Commission may by rules and regulations prescribe as necessary or appropriate for purposes of the administration of this Act, including accounts, records, and memoranda of the generation, transmission, distribution, delivery, or sale of electric energy, the furnishing of services or facilities in connection therewith, and receipts and expenditures with respect to any of the foregoing: *Provided, however*, That nothing in this Act shall relieve any public utility from keeping any accounts, memoranda, or records which such public utility may be required to keep by or under authority of the laws of any State. The Commission may prescribe a system of accounts to be kept by licensees and public utilities and may classify such licensees and public utilities and prescribe a system of accounts for each class. The Commission, after notice and opportunity for hearing, may determine by order the accounts in which particular outlays and receipts shall be entered, charged, or credited. The burden of proof to justify every accounting entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry, and the Commission may suspend a charge or credit pending submission of satisfactory proof in support thereof.

The principal connections which remained after the passage of the Act were (1) with an interstate line from Massachusetts owned by the Connecticut Power Company (a separate organization) which is tapped by the petitioner; and (2) with facilities which transmitted electric energy to Fishers Island in New York until 1941. We will consider the effect of these interstate connections separately.

The Power Line from Massachusetts Tapped by the Petitioner.

The Connecticut Power Company in the operation of the Connecticut Valley Power Exchange supplies energy from various plants in Massachusetts to an interstate power line which is tapped in Connecticut by petitioner to supply East Hampton, Torrington-Winsted and Bristol. While there are sources of supply within the state for these communities, meter readings taken by the government show that a substantial amount of current reaches these communities from this interstate power line. We need not consider seriously the contention of the petitioner that scientifically conclusive proof of interstate transmission of energy is impossible because, as testified by petitioner's experts, "with all the information it is ever going to be possible for us to obtain, nobody is ever going to answer the question in a unique way as to which load the power from a particular station goes to". A distinction between electric current as measured on a meter and electric energy was certainly not within the contemplation of Congress when it passed the Act: indeed, no scientist knows what the nature of electric energy is. Ordinary meter readings which measure electric current are sufficient data on which to make charges for electricity to users. That they are equally sufficient to determine the interstate transmission of energy under the Federal Power Act is shown by the case of *Jersey Central Company* v. *Federal Power Commission*, 319 U. S. 61 (1943).

A more serious question which petitioner raises is whether the ownership of facilities in Connecticut for tapping an interstate line in order to supply power to local communities is sufficient to make it a public utility. Petitioner contends that such facilities are not within the jurisdiction of the Commission because they are used in local distribution. Petitioner's argument runs as follows: It is not required to keep accounts unless it is a "public utility". [Section

301] A public utility is any person who owns or operates facilities subject to the *jurisdiction* of the Commission [Section 201(e)]. The Commission does not have *jurisdiction*, except as specifically provided, over facilities used in local distribution. [Section 201(b)] While the Act specifically provides for the keeping of accounts on facilities in [fol. 1173] local distribution it does not specifically provide for *jurisdiction* over such local facilities. [Section 301] From this it is argued that even though the energy which petitioner distributes comes from another state it is not a public utility under the jurisdiction of the Commission because the facilities which it owns are for local distribution.

Such a construction is a grammatical possibility. However, it contradicts the broad purpose of the Act to correct abuses of write-ups, inflation of accounts and similar practices which have on occasion been found in the utility industry. It would permit a company which operated facilities that were normally designed for the interstate transmission of electric power to split itself into segments, one of which owned the power line and the other the distribution system. By such artificial corporate manipulation the Federal Power Commission would get jurisdiction over the tail of what was in fact an interstate set-up (to wit: the high voltage line), and lose jurisdiction over the dog (the main distribution system). It would encourage the setting up of unnecessarily complicated accounting systems between the owners of the segments of the artificially divided power system, which the Act is designed to eliminate. The Federal Power Act obviously intends to confer Federal jurisdiction upon electric distribution systems which normally would operate as interstate businesses. It is not an act to put a premium on artificial corporate reorganization. It is not surprising, therefore, that the construction urged by the petitioner has been expressly overruled in the case of *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953 (C. C. A. 2nd, 1942), cert. den. 319 U. S. 741 (1943). The opinion of Judge Frank in that case analyzes the provisions of the Act so well that we need not repeat it here. He reaches what seems to us the proper conclusion that Section 201(b) means to give the Commission jurisdiction over any facility for the transmission of electric energy in interstate commerce. The "but" clause in the section is intended to make it clear that this jurisdiction extends even to local facilities where the Act provides for

their regulation, as it does in the case of accounting practices.

Therefore, whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as "local" is not relevant to this case. The sole test of jurisdiction of the Commission over accounts is whether these facilities, "local" or otherwise, are used for the transmission of electric energy from a point in one state to a point in another.[3] Since actual meter readings in this case show such an interstate flow of current to supply petitioner's facilities it is a public utility under the Act.

The only alternative to such a conclusion is to adopt the argument of the petitioner that a point can be selected in the [fol. 1174] instantaneous transmission of energy from Massachusetts to Connecticut where interstate transmission ends and intrastate transmission begins. Petitioner suggests that point can be found at the station where it taps the admittedly interstate line. This theory assumes that electricity is carried in little buckets. The owner of the interstate line carries the bucket on its interstate journey and hands it to the petitioner in Connecticut. And thus the transmission of electricity is made to look like the sale of a pair of shoes. This conception contradicts all we know about electrical transmission. It is the kind of mythological offspring of a union between the law and the natural sciences that makes scientists (except expert witnesses) tear their hair. It is true that such myths cannot be avoided as the vehicle of judicial discussion in many cases,—for example where the issue is the limits of taxing power between Federal and State governments. But those are cases where it is apparent that Congress intended the courts to use

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[3] There is a superficial inconsistency between the above statement and the concluding phrase in Section 201(a) "* * *" such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States". This limitation, however, has been held by the Supreme Court of the United States not to apply to the sections of the Act which specifically give the Federal Power Commission jurisdiction over matters of financial arrangement, such as the accounting section which we are discussing here. *Jersey Central Co. v. Federal Power Com.*, 319 U. S. 61.

such artificial conceptions. We believe it was to escape this legal-electric mythology that the Federal Power Act made the test of jurisdiction depend, not on the current definition of "interstate commerce" but on the actual transmission of electric energy from one state to another without regard to the mechanical means of that transmission. This language gives us no excuse for indulging in the bucket theory of electrical transmission or for differentiating between the different kinds of equipment over which the energy flows in its instantaneous passage from a generator in one state to a consumer in another. It makes the test of whether such energy is actually transmitted between the two states the simple and practical one of reading a meter.

The adoption of this test, based on the underlying purpose of the Act, compels us to give serious consideration to petitioner's argument that it is being used here to defeat the purpose of the Act by giving the Commission jurisdiction over a system that is essentially intrastate because of some trivial or temporary connection from the outside. We do not believe Congress intended that a large electric power system which was essentially intrastate in character should come under Federal jurisdiction because of some insignificant or temporary outside connection. But if we keep the purpose of the Act in mind we can avoid unreasonable extensions of Federal jurisdiction. The court needs only to look at the character of the organization and its facilities in order to determine whether it can reasonably be classified as an interstate system. Intelligent interpretation of the Act does not bind us to a rule of thumb.

In the case before us the history of petitioner's operations removes all doubt as to its essentially interstate character. At the time the Act was passed petitioner's transmission system was so clearly interstate in character that it could operate most economically only by taking advantage of the savings afforded by an interstate electrical pool. The severing of connections, both contractual and otherwise, with that pool was not done as a normal business operation but as a last minute attempt to escape Federal jurisdiction. In order to accomplish that severance petitioner was compelled to load on to consumers unnecessary additional expense in furnishing electricity. The record contains evidence which establishes the improvident business character of converting the system to a relatively intrastate opera-

[fol. 1175] tion.[8] The attempt to make petitioner's operations appear intrastate was an artificial and costly gesture against sound business policy and against the interests of Connecticut consumers. And even after this gesture had been made there still remained some interstate connections which apparently could not be severed. The evidence that the use of petitioner's facilities on a purely intrastate basis was not a normal nor an efficient nor an economical use of that system supports the finding that it is in fact a system designed for interstate transmission of electricity. In severing its connections to avoid Federal jurisdiction petitioner restricted the availability of low cost electricity in Connecticut and raised a serious question whether such a restraint of interstate commerce for such a purpose was legal. But whether legal or not, it was an abnormal use of the transmission system, a use that would have amounted to bad business management except for the desire to escape Federal jurisdiction. These considerations are sufficient to convince us that the Commission in this case is not attempting to control a normally intrastate business through the accident of a trivial outside connection.

Transmission of Energy to Fishers Island, New York.

The second connection with interstate transmission relied on by the government to support Federal jurisdiction is the fact that from the time of the passage of the Act until February, 1941, petitioner was supplying electric current to Fishers Island in New York. The current was sold to the Borough of Groton and resold by that municipality to Fishers Island. Petitioner stopped supplying the Borough with

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[8] "In the event that you wish to separate our systems, the matter can perfectly well wait until the time of the December peak has passed.

"Our reason for the above decision is that we believe that the chance of our position being overruled by the courts is too remote to justify the loss of $100,000 a year and the greater plant investment to be shortly required under the present operating condition."

(Excerpt from letter of S. Ferguson, Chairman of the Board of Directors, Connecticut Power Company, to J. Henry Roraback, President, Connecticut Light & Power Company, dated November 19, 1935.)

electricity for resale on the pretended ground that such resale was an ultra vires act. The actual reason was to escape Federal jurisdiction. Petitioner cannot escape Federal jurisdiction on the ground that the interstate movement of electric current to Fishers Island did not begin until the energy left the facilities of the petitioner at Groton. The current transmitted to Fishers Island amounted to only .2% of petitioner's business, but this fact would be significant only in a case where the Commission was attempting to get jurisdiction over a normally intrastate business because of some temporary and negligible outside sales. As we have shown, this is not such a case.

The finding of the Commission that the petitioner is a public utility is amply supported by the evidence. Its order will, therefore, be

Affirmed.

[fol. 1176] [Stamp:] United States Court of Appeals for the District of Columbia. Filed Feb. 28, 1944. Joseph W. Stewart, Clerk

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA, JANUARY TERM, 1944

No. 8341

THE CONNECTICUT LIGHT AND POWER COMPANY, Petitioner,

vs.

FEDERAL POWER COMMISSION, Respondent

Petition for Review of Order of the Federal Power Commission

JUDGMENT AND DECREE

This cause came on to be heard on the transcript of the record from the Federal Power Commission, and was argued by counsel.

On consideration whereof, It is now here adjudged and decreed by this Court that the order of the said Federal Power Commission on review in this cause be, and the same is hereby, affirmed.

Per Mr. Justice Arnold.

Dated February 28, 1944.

[fol. 1177] [Stamp:] United States Court of Appeals for the District of Columbia. Filed Mar. 13, 1944. Joseph W. Stewart, Clerk

IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

No. 8341

THE CONNECTICUT LIGHT AND POWER COMPANY, Petitioner,

vs.

FEDERAL POWER COMMISSION, Respondent

PETITION FOR REHEARING

The Connecticut Light and Power Company, Petitioner, respectfully petitions this Honorable Court, under the provisions of its General Rules 26 and 31, to grant to it a rehearing of the above-entitled cause and as reasons for its petition shows:

1. This cause came before this Court on petition for review of an order of the Federal Power Commission (hereinafter called "the Commission") dated May 15, 1942. The order required the Petitioner to comply with certain orders and accounting requirements prescribed by the Commission applicable to "public utilities" within the meaning of that term as used in Section 201 of the Federal Power Act.[1] The ultimate questions in the hearing before the Commission and upon the petition for review in this court were whether the Petitioner is or at any time since August [fol. 1178] 26, 1935 has been such a "public utility". The Petitioner contended before the Commission and in this Court that it is not and at no such time had been such a "public utility". The Commission based its conclusion that the Petitioner was such a public utility upon its holding that the Petitioner at all times since August 26, 1935, had owned facilities subject to its jurisdiction under Part II of the Act, finding that it owned "facilities for transmission of electric energy in interstate commerce" and that certain

[1] Act of August 26, 1935, c. 687 (49 Stat. 847, U. S. C., Title 16, § 824). This section of the Act is copied in the Appendix, pp. 10-20, *infra*.

of these facilities were not "facilities used in local distribution" within the meaning of Section 201(b)[2] of the Act.

2. Each of the parties filed a brief in this Court and the Petitioner also filed a reply brief. Oral arguments were held on December 8, 1943, before Mr. Justice Miller, Mr. Justice Arnold, and Judge Dobie. On February 28, 1944, the Court handed down its opinion affirming the order of the Federal Power Commission.

3. The Petitioner in this Court challenged certain findings of fact of the Commission bearing upon the jurisdiction of the Commission and contended that the Act must be construed as requiring this Court to weigh the evidence and make its own determination of jurisdictional facts, and in the alternative contended that if the statute were construed as requiring this Court merely to ascertain whether there was substantial evidence to support such findings it would be unconstitutional, for reasons set forth in its brief and [fol. 1179] mentioned hereafter.

The opinion of the Court stated:

> "* * * Since it is conceded that the petitioner must comply with the order if it is a public utility under the Act, the sole question before us is whether the finding of the Commission to that effect is sustained by substantial evidence and by a correct interpretation of the law."

It is apparent from the opinion that the Court did not consider that it was under the duty of weighing the evidence and making its own determination of the jurisdictional facts upon the evidence. The opinion contains no discussion of the following contentions made in our original brief (pp. 28-29):

> "* * * this Court is under the duty of weighing the evidence and making its own determination thereon. If the statute were construed to require this Court merely to ascertain whether there was some substantial evidence to support the findings, it would be unconstitutional (1) in that it would deprive Petitioner of

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[2] Act of August 26, 1935, c. 687 (49 Stat. 847, U. S. C., Title 16, § 824(b)).

property without due process of law in violation of the provisions of Article V of the Amendments to the Constitution of the United States; (2) that it would curtail the powers of the Judiciary in violation of the provisions of Article III, Sec. 2 of the Constitution; and (3) that it would confer on the United States a power reserved to the State of Connecticut in violation of the provisions of Article X of the Amendments. *Crowell* v. *Benson*, 285 U. S. 22; *St. Joseph's Stock Yards Co.* v. *United States*, 298 U. S. 38, 51; *Baltimore & Ohio Rd. Co.* v. *United States*, 298 U. S. 349, 364; *Bradley Lumber Co.* v. *National Labor Relations Board*, 84 F. 2d 97, 100 (C. C. A. 5th), cert. den. 299 U. S. 559; *National Labor Relations Board* v. *Cherry Cotton Mills*, 98 F. 2d 444, 446 (C. C. A. 5th). See also *United States* v. *Appalachian Electric Power Co.*, 107 F. 2d 769, 791 (C. C. A. 4th), reversed 311 U. S. 377 (see pp. 403, 404, 429); *Ohio Valley Water Co.* v. *Ben Avon Borough*, 253 U. S. 287; *Gudmundson* v. *Cardillo*, 126 F. 2d 521, 524, 75 App. D. C. 230.

[fol. 1180] "In this connection it should be borne in mind that it is expressly stipulated in Section 313(b) of the Federal Power Act, which provides for review by this Court, that upon the filing of the transcript herein, 'such court shall have exclusive jurisdiction to affirm, modify or set aside such other, in whole or in part', and that the statute contains no other provision for challenging the order of the Commisison or any finding of fact upon which it is based.[3]

"The statute should not be construed in such a way as to raise grave doubt as to its constitutionality. *Crowell* v. *Benson*, 285 U. S. 22, 62, and cases there cited."

We respectfully submit that these contentions should be considered upon a rehearing.

4. The opinion of the Court in effect sustains the finding of fact by the Commission that a substantial amount of electric energy from outside of Connecticut reached the facili-

[3] Act of August 26, 1935, c. 687 (49 Stat. 860), U. S. C. Title 16, §825 *l*(b).

ties of the Petitioner at East Hampton, Torrington-Winsted and Bristol. In its discussion of this matter the opinion of the Court says:

> "* * * We need not consider seriously the contention of the petitioner that scientifically conclusive proof of interstate transmission of energy is impossible because, as testified by petitioner's experts, 'with all the information it is ever going to be possible for us to obtain, nobody is ever going to answer the question in a unique way as to which load the power from a particular station goes to.' A distinction between electric current as measured on a meter and electric energy was certainly not within the contemplation of [fol. 1181] Congress when it passed the Act; indeed, no scientist knows what the nature of electric energy is. Ordinary meter readings which measure electric current are sufficient data on which to make charges for electricity to users. That they are equally sufficient to determine the interstate transmission of energy under the Federal Power Act is shown by the case of *Jersey Central Company* v. *Federal Power Commission*, 319 U. S. 61 (1943),"

This seems to us to indicate that the Court misunderstood our contention in regard to the matter.

The facts were that the facilities of the Petitioner in quesion were at all times connected with generating plants in Connecticut which contemporaneously generated more than the combined loads of these three areas of the Petitioner. (App.[4] 949-953) As the engineer of the Commission admitted, there were no meters which showed the source of the energy which reached the facilities of the Petitioner.[5] The

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[4] "App." refers to the Appendix to Brief of Petitioner, containing extracts from the evidence, etc.

[5] The following are extracts from the testimony of the Commission's engineer, Thomas (App. 601-603):

"Q. Now, I think that you testified in effect that there were instruments for determining the flow of energy and he rate of flow that you designated as watt-meters or watthour meters; is that correct? A. I remember stating that.

generating plants in Connecticut were nearer these loads [fol. 1182] of the Petitioner than were the generating plants in Massachusetts. (See App. 1113) In these circumstances we contend there was no established principle by which energy reaching the facilities of the Petitioner could be identified as coming from Massachusetts.

We did not suggest that there was any "distinction between electric current as measured on a meter and electric energy * * * within the contemplation of Congress when it passed the Act."

As the Court evidently misunderstood our contentions, we submit that the matter should be clarified on rehearing.

5. The opinion of the Court concludes that the ownership of facilities "used in local distribution" is sufficient to

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"Q. Such meters, of course, do not show the source of the energy, do they? A. Well, the meter itself doesn't have a marking on it to show where it came from. In Mr. Miller's case, the meter doesn't show red and blue or anything of that sort.

"Q. And of course there is not at Bristal or Winsted or any of the East Hampton District any instrument which shows the source of the energy that was received there at any time? A. No, not that you can determine from the reading on the instrument.

"Q. And as a matter of fact it is impossible by examining or by any other observation that you can make of energy at a particular point, to know where it is generated? A. I think that is correct.

* * * * * * *

"Q. Let me ask you a specific question. Let us assume that there is energy put on the CP line No. 1 from Falls Village, and there is also energy put on that line from Hartford. There is no physical observation or no reading of any meter on that line that would enable you to determine at any particular point what proportion of the energy came from one source and what from the other? A. Well, the instruments that are put on the line are only intended to read the total. So, of course——

"Q. And the — A. So, of course, they wouldn't indicate parts. They are not intended for that purpose."

submit the Petitioner to the jurisdiction of the Commission as a "public utility" within the meaning of the Act if the facilities are also facilities "for transmission of electric [fol. 1183] energy in interstate commerce." In doing this, it construes the clause which it designates as the "but" clause in Section 201(b) of the Act not as an exception to the preceding part of the sentence in which it occurs (as we contended it should be), but as "intended to make it clear that this jurisdiction extends even to local facilities where the Act provides for their regulation." It is noteworthy that the opinion of the Commission did *not* so construe this clause.

The opinion of the Court concedes that the construction for which we contended is a "grammatical possibility," and states that "there is a superficial inconsistency" between the construction which the Court adopts and the concluding phrase of Section 201(a).

The sentence in Section 201(b)[6] in which the clause in question occurs is as follows:

> "* * * The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter."

The exceptions "specifically provided in this Part and the Part next following" appear to relate only to facilities for generation—which are referred to in various provisions of these Parts. But "facilities used in local dis- [fol. 1184] tribution" are nowhere else specifically referred to—unless perhaps in Section 303,[7] which applies only to agencies of the United States. Conceivably the exception

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[6] Act of August 26, 1935, c. 687 (49 Stat. 847), 16 U. S. C. § 824(b).

[7] Act of August 26, 1935, c. 687 (49 Stat. 855), 16 U. S. C. 825b.

clause under discussion is intended to indicate that if a company is a public utility or if a company's aid is needed in an emergency its distribution facilities as well as its other facilities may be subject to the Commission's orders, but even if this is one purpose of the clause, we submit that it was also its purpose to exempt "facilities used in local distribution" as a basis for the general jurisdiction of the Commission.

The reasoning of the opinion of this Court in support of its conclusion appears to be based upon "the broad purpose of the Act," but we submit that the legislative history of the Act shows clearly that the purpose of the Act was not to give the Commission jurisdiction over a company owning only facilities used in local distribution.

The legislative history of the Act is set forth in some detail in *Jersey Central Power & L. Co.* v. *Federal Power Commission*, 129 F. 2d 183, 193, 194, and the dissenting opinion in *Jersey Central Co.* v. *Federal Power Commission*, 319 U. S. 61, 85-87, to which for convenience we hereby refer. The outstanding significant facts in respect of the clause under discussion are that Congress clearly did not intend to extend Federal jurisdiction to all facilities connected "as parts of a system of power transmission situated in more than one state" (as proposed in the bill originally introduced in the Senate),[8] that continual efforts were [fol. 1185] made to narrow the basis of jurisdiction originally proposed, and that the ultimate intention was to exclude "facilities used in local distribution" from the categories of facilities subjecting a company to the general jurisdiction of the Commission.

The provision for jurisdiction over facilities in Section 201(a) of the Bill as reported to the Senate by the Senate Committee (designated S. 2796) and as the Bill passed the Senate was as follows:

> "The Commission shall have jurisdiction over all facilities for such production, transmission, or sale of electric energy by any means and over all facilities connected therewith as parts of a system of power transmission situated in more than one State, except facilities used only for the production or transmission of electric energy in intrastate commerce or in local dis-

[8] S. 1725, 74th Cong. 1st Sess., February 6, 1935.

tribution or for the use of the producer or transmitter."[9]

This, it is clear, specifically excepted from the jurisdiction of the Commission "facilities used in local distribution."

The House Committee on Interstate and Foreign Commerce rewrote certain provisions of the Bill and reported it to the House (S. 2796 with amendments, Report No. 1318, House of Representatives, 74th Congress, 1st Session). As so reported, the clause applying to "facilities used in local distribution" was the same as in the Act finally passed, except that it did not contain the words "except as specifically provided in this Part and the Part next following." The House enacted the clause as reported.

It is clear that the House did not intend to confer juris- [fol. 1186] diction of the Commission over a company because of ownership of facilities used in local distribution. The Report of the House Committee contained the following language (p. 27):

> "As in the Senate bill no jurisdiction is given over local distribution of electric energy, and the authority of States to fix local rates is not disturbed even in those cases where the energy is brought in from another State."

Throughout the discussion on the floor of the House there appear abundant manifestations of Congressional purpose to preserve to the States the powers which they then had. See 79 Cong. Rec. Part 9, pp. 10357, 10377, 10378, 10384-10387, and Part 10, 10574.

Owing to the differences between the bills passed by the two Houses, the matter was referred to conferees.

They inserted the phrase "except as specifically provided in this Part and the Part next following." This is the first time this phrase appears, and the Report of the House conferees accompanying the Conference Report (74th Congress, 1st Session, House Report No. 1903, p. 74) asserted that it is merely "a clarifying phrase added to remove any doubt as to the Commission's jurisdiction over facilities used for the generation and local distribution of electric energy to

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[9] *Jersey Central Power & L. Co.* v. *Federal Power Commission*, 129 F. 2d 183, 193.

the extent provided in *other* sections of this part and the part next following." (Emphasis ours.) In the light of this statement and the fact that there was no dispute between the House and the Senate as to the provision regarding local distribution, it is clear that this clause was not intended to enlarge the basis of general jurisdiction of the Commission as previously limited.

[fol. 1187] For purposes of determining the general jurisdiction of the Commission the Part next following, i. e., Part III, must be disregarded, inasmuch as Section 201(e) [10] provides:

> "The term 'public utility' when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under *this* Part." (Emphasis ours.)

Facilities for local distribution are nowhere specifically mentioned in other sections of "this Part", i. e., Part II, and if they are included to any extent, it is only for temporary purposes. Section 202(d) [11] provides that persons not otherwise subject to the jurisdiction of the Commission "shall not become subject to the jurisdiction of the Commission by reason of such temporary connection or temporary construction." Thus it is clear that the jurisdiction of the Commission is not to attach solely because of facilities used in local distribution.

The matter is definitely and clearly summarized in the following extract from the opinion in *Jersey Central Power & L. Co.* v. *Federal Power Commission*, 129 F. 2d 183, 194:

> "As we have said Section 201(a) of the Act states explicitly that the federal regulation proposed by the Act is intended 'to extend only to those matters which are not subject to regulation by the States', and that Section 201(b) says with equal clarity that the Commission 'shall not have jurisdiction * * * over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, * * *.'

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[10] 49 Stat. 847, c. 687, 16 U. S. C. §824(e).

[11] 49 Stat. 847, c. 687, 16 U. S. C. §824a(d).

[fol. 1188] Generation of electricity, its local distribution or its transmission in intrastate commerce are not within the purview of the Act or the jurisdiction of the Commission."

This Court also appears to have been moved to adopt its construction of the "but" clause by its feeling that any other construction "would permit a company which operated facilities which were normally designed for interstate transmission of electric power to split itself into segments, one of which owned the power line and the other the distribution system." No such splitting up of companies is involved here or is possible here. The Petitioner owns no interstate power line and no power line connected with an interstate power line. Its fundamental business is generating power in Connecticut and distributing it to customers in Connecticut. If (contrary to our contentions) some energy from Massachusetts did come to the facilities of the Petitioner under discussion, that was a matter which was not subject to the control of the Petitioner and constituted but a trivial incident in the business of the Company.

Moreover, if such a construction of the Act would encourage the splitting up of a company into segments some of which would not be subject to the jurisdiction of the Federal Power Commission, that would not appear to be a reason for rejecting such a construction. The broad purpose of the Act, we submit, was to submit to Federal jurisdiction only facilities which are not subject to State jurisdiction.

[fol. 1189] Part II of the Federal Power Act, on its face, attempts to limit the sphere of federal authority delegated thereby and to preserve certain matters for State jurisdiction. Thus, in Section 201(a), Congress asserted federal regulation of certain phases of the electric utility business to be "necessary in the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States." Section 201(a).

The reports of both the Senate Committee and the House Committee on the bill contained the following statement in regard to Section 201(a):

> "Subsection (a) contains a declaration of the necessity for federal regulation and *defines the scope of that regulation* • • •" (Italics ours). Senate Report

621, 74th Congress, 1st Session, p. 48. House Report 1318, 74th Congress, 1st Session, p. 26.

Even the report of the Senate Committee on Interstate Commerce which accompanied the Bill (S 2796) in the form in which it was presented to the Senate (with the broad language quoted above) stated that it "would impose Federal regulation only over those matters which cannot be effectively controlled by the States." (Senate Report No. 621, page 18, 74th Congress, 1st Session).

And on the floor Senator Wheeler, who was in charge of the Bill, said (Congressional Record, Vol. 79, Part 8, p. 8399):

> "Utility operations, except where they extend beyond state lines, are of course matters of local or state concern; * * *".

Clearly, a company which is engaged in local distribution would be subject to State regulation, and if the other company owning the interstate line was subject to Federal jurisdiction, the purposes of the Act would be fulfilled. [fol. 1190] The opinion of the Court states that the construction for which we contend "would encourage the setting up of unnecessarily complicated accounting systems between the owners of the segments of the artificially divided power system, which the Act is designed to eliminate". We believe that this statement must have come from a misunderstanding of the situation. The facilities of the Petitioner under discussion at Bristol, for instance, were once owned by an independent company. If they were transferred back to an independent company, the result would simply be that the Bristol company would keep merely the accounts required by State law and not those required by the Federal Power Commission. Under the construction adopted by this Court, however, all of the accounts of the entire system of the Petitioner covering 107 cities, towns and boroughs must be kept in the manner required by the State law and another set of accounts for this entire system must be kept as provided by the Federal Power Commission.

Moreover, we are unable to perceive how such a splitting of a company into segments (or into two separate companies), such as the opinion suggests, would lead to "unnecessarily complicated accounting systems between the

owners of the segments". Presumably if there were such a splitting, one company would sell energy to the other, but that would lead to no complications. Such sales could be made under the simple procedure which now prevails in the numerous cases in Connecticut in which one company sells energy to another. Examples of this are the sales of the Connecticut Power Company to the Petitioner which are involved in this case.

On the other hand, the construction adopted by the Court will actually place a tremendous burden on many companies, [fol. 1191] for it will require them to keep two sets of accounts for their entire systems if anywhere for their local distribution they receive some energy generated outside of the State which they serve.

6. The holding of the Court that the facilities of the Petitioner under discussion are facilities "for the transmission of electric energy in interstate commerce" appears to us to adopt a theory of interstate commerce essentially different from that which has been adopted by the Supreme Court.

The fact that the journey of electric energy from generator to consumer is virtually instantaneous does not determine the question whether energy is in interstate or intrastate commerce at any given point in that journey. As the Court said in *Southern Pacific Company* v. *Gallaher*, 306 U. S. 167, 177:

> "'Practical continuity' does not always make an act a part of interstate commerce."

And the Courts have had no difficulty in dividing the journey of electric energy for jurisdictional purposes. See *Utah Power & Light Co.* v. *Pfost*, 286 U. S. 165, 179; *South Carolina Power Co.* v. *South Carolina Tax Commission*, 52 F. 2d. 515, 524-525.

We submit that the situation here is like that discussed in *Missouri* v. *Kansas Gas Co.*, 265 U. S. 298, 308-309, and in such cases as *Lone Star Gas Co.* v. *Texas*, 304 U. S. 224; *South Carolina Power Co.* v. *South Carolina Tax Commission*, 52 F. 2d 515 (E. D. S. C. 1931), aff'd 286 U. S. 525; 60 F. 2d 528, aff'd *sub nomine Broad River Power Co.* v. *Query*, 288 U. S. 178; *Banker Brothers Co.* v. *Pennsylvania*, 222 U. S. 210. See also *Southern Gas Corp.* v. *Alabama*, 301 U. S. 148, 154-155.

[fol. 1192] The opinion of this Court states that "it [its construction of the phrase 'transmission of electric energy in interstate commerce' "] makes the test of whether such energy is actually transmitted between the two states the simple and practical one of reading a meter", but here again we believe that the Court has misunderstood the evidence. Under such a test there has been no interstate commerce on the Petitioner's facilities, for no simple and practical reading of a meter discloses it. There was, and could be, no meter of which a simple and practical reading would show that energy came to Petitioner's facilities from Massachusetts. (See testimony of Thomas, quoted above, and App. 872). It may well be that the test as to whether such energy is actually transmitted between the two States is the simple and practical one of reading a meter, and it is possible in many cases, such as the transmission from Massachusetts to the Connecticut Power Company, so to determine that there is such transmission.

7. The opinion concludes that the Petitioner's operations have "an essentially interstate character" and evidently relies upon this conclusion in applying the provisions of the Act to it. We believe that in coming to this conclusion the Court may have confused the facilities of the Petitioner with those of other companies, including an entirely independent company with a similar name, the Connecticut Power Company.

[fol. 1193] The Connecticut Power Company owns the long transmission line which extends from the Massachusetts boundary south and west through Hartford and various Connecticut cities and towns almost to the westerly boundary of Connecticut. The Petitioner never owned any such line (or any transmission line running to the State boundary); and as has been pointed out, its business is generation of electric energy in Connecticut and distribution of electric energy in Connecticut.

Only 3 out of the 107 cities, towns and boroughs which it has served with electric energy were connected with this line of the Connecticut Power Company, and the contracts for the supply of these 3 did not call for energy generated in Massachusetts. The line was connected with generating plants in Hartford and other places in Connecticut. The contracts contained no express provision as to the source of the energy, but there was a provision that the unit charge

for energy supplied should be adjusted on the basis of the cost of coal, in the bunkers of the South Meadow plant of the Hartford Electric Light Company in Hartford, and the Hartford Electric Light Company contracted to supply the Connecticut Power Company with such capacity as might be required, in addition to the capacity of the Connecticut Power Company's own water power plants in Connecticut, to carry the loads on the C. P. 1 and 2 lines, including those in the three areas of the Petitioner under discussion. (Ex. 8, App. 1039; Ex. 25, App. 1055; Ex. 30, App. 1063; Exs. 36 and 37, App. 1081; App. 941-944, 961, 964-966).

As the opinion seems to rely heavily in various places on what it denominates as the "essentially interstate character [fol. 1194] of Petitioner's business", we submit that this matter should be clarified on rehearing.

8. The opinion of the Court contains no discussion of the contention made in part C of the brief of the Petitioner, which was headed as follows:

> "PETITIONER WAS DENIED A FAIR TRIAL (1) BECAUSE OF THE REFUSAL OF THE COMMISSION TO CONSIDER EVIDENCE OFFERED BEARING UPON THE MEANING OF THE WORDS 'USED IN LOCAL DISTRIBUTION' AS APPLIED TO FACILITIES OF PETITIONER, AND (2) BECAUSE OF THE RECEPTION OF A MASS OF INCOMPETENT EVIDENCE OVER PETITIONER'S OBJECTIONS."

We understand that under the construction of the Act adopted by the Court, the meaning of the words "used in local distribution" as applied to facilities of the Petitioner is unimportant. Nevertheless, even if this be eliminated from consideration, we submit that the reception of a mass of incompetent evidence relating to other matters entitles the Petitioner to a new trial before the Commission, and that this Court should grant a rehearing to consider this contention.

Wherefore the Petitioner respectfully requests that this Honorable Court grant it a rehearing.

By its attorneys, Claude R. Branch, 30 State Street, Boston, Massachusetts; Lawrence A. Howard, 750 Main Street, Hartford, Connecticut.

[fol. 1195] APPENDIX

Statutes Involved

Federal Power Act

Act of August 21, 1935, C. 687, Title II (49 Stat. 838)

Part II—Regulation of Electric Utility Companies Engaged in Interstate Commerce

Declaration of Policy; Application of Part; Definitions

Section 201. (a) It is hereby declared that the business of transmitting and selling electric energy for ultimate distribution to the public is affected with a public interest, and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following and of that part of such business which consists of the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce is necessary in the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.

(b)[1] The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydro-electric energy which is transmitted across a State line. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part [fol. 1196] and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

(c)[2] For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if trans-

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[1] 49 Stat. 847, U. S. C. Title 16, § 824(b).

[2] 49 Stat. 848, U. S. C. Title 16, § 824(c).

mitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States.

(d)[3] The term "sale of electric energy at wholesale" when used in this Part means a sale of electric energy to any person for resale.

(e)[4] The term "public utility" when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part.

(f)[5] No provision in this Part shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State, or any agency, authority, or instrumentality of any one or more of the foregoing, or any corporation which is wholly owned, directly or indirectly, by any one or more of the foregoing, or any officer, agent, or employee of any of the foregoing acting as such in the course of his official duty, unless such provision makes specific reference thereto.

[fol. 1197] CERTIFICATE OF SERVICE

Service accepted March 13, 1944.
Charles V. Shannon, General Counsel, Federal Power Commission.

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[3] 49 Stat. 848, U. S. C. Title 16, § 824(d).
[4] 49 Stat. 848, U. S. C. Title 16, § 824(e).
[5] 49 Stat. 848, U. S. C. Title 16, § 824(f).

[fol. 1198] [Stamp:] United States Court of Appeals for the District of Columbia. Filed Mar. 25, 1944. Joseph W. Stewart, Clerk.

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA, JANUARY TERM, 1944

No. 8341

THE CONNECTICUT LIGHT & POWER COMPANY, Petitioner,

vs.

FEDERAL POWER COMMISSION, Respondent

Before Miller, and Arnold and Dobie, JJ.

ORDER

On consideration of petitioner's petition for rehearing filed in this cause, It is

Ordered by the Court that the petition be, and it is hereby, denied.

Per Curiam.

Dated March 25, 1944.

[fol. 1199] [Stamp:] United States Court of Appeals for the District of Columbia. Filed Apr. 15, 1944. Joseph W. Stewart, Clerk.

IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

No. 8341

THE CONNECTICUT LIGHT AND POWER COMPANY, Petitioner,

v.

FEDERAL POWER COMMISSION, Respondent

DESIGNATION OF RECORD

The Clerk will please prepare a certified transcript of record for use on petition to the Supreme Court of the

United States for writ of certiorari in the above-entitled cause, and include therein the following:

1. Appendix to appellant's brief.
2. Minute entry of argument.
3. Opinion.
4. Judgment.
5. Petition for rehearing with Clerk's memorandum of filing of petition for rehearing.

* * * * * * *

7. Order entered denying petition for rehearing.
8. This designation.
9. Clerk's certificate.

Claude R. Branch, Attorney for Petitioner.

Service accepted April 15, 1944.
Charles V. Shannon, General Counsel, Federal Power Commission.

[fol. 1200] UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

I, Joseph W. Stewart, Clerk of the United States Court of Appeals for the District of Columbia, hereby certify that the foregoing pages numbered from 1 to 1199, both inclusive, constitute a true copy of the appendix to the petitioner's brief and the proceedings of the said Court of Appeals as designated by counsel for petitioner in the case of: The Connecticut Light and Power Company, Petitioner, vs. Federal Power Commission, Respondent, No. 8341, April Term, 1944, as the same remain upon the files and records of said Court of Appeals.

In testimony whereof, I hereunto subscribe my name and affix the seal of said Court of Appeals, at the City of Washington, this twentieth day of April, A. D., 1944.

Joseph W. Stewart, Clerk of the United States Court of Appeals for the District of Columbia. (Seal.)

[fol. 1201] SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed October 9, 1944

The petition herein for a writ of certiorari to the United States Court of Appeals for the District of Columbia is granted.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

FILE COPY

Office - Supreme Court, U. S.
FILED
JUN 23 1944
CHARLES ELMORE CROPLEY
CLERK

In the

Supreme Court of the United States.

OCTOBER TERM, 1943.

No. 189

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA AND BRIEF IN SUPPORT THEREOF.

CLAUDE R. BRANCH,
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JUNE, 1944.

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OTHER AUTHORITIES.

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House Report No. 1318, 74th Cong., 1st session 29
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Senate Report No. 1725, 74th Congress, 1st session 28
Senate Report No. 621, 74th Congress, 1st session 21

In the

Supreme Court of the United States.

OCTOBER TERM, 1943.

No.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

PETITION FOR WRIT OF CERTIORARI TO THE COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

The undersigned, on behalf of the above-named Petitioner, pray that writ of certiorari issue to review the judgment of the Court of Appeals for the District of Columbia entered on February 28, 1944, in the case between the above-named parties docketed therein as No. 8341.

OPINIONS.

The opinion of the Federal Power Commission, F.P.C. Opinion No. 75, May 15, 1942, is reported in 44 P.U.R. (NS) 170. (R. 63)[1] The opinion of the Court of Appeals for the District of Columbia (R. 1170) is reported in 141 F. 2d 14.

[1] This record is in several volumes, headed "Appendix to Brief for Petitioner."

JURISDICTION.

The judgment of the Court of Appeals for the District of Columbia was entered on February 28, 1944. Petition for rehearing was filed by Petitioner on March 13, 1944 (R. 1179), and was denied on March 25, 1944. (R. 1195)

The jurisdiction of this Court is invoked under Section 313(b) of the Federal Power Act,[2] 49 Stat. 860, 16 U.S.C., Section 8251(b), and Section 240 of the Judicial Code as amended, U.S.C., Title 28, Section 347.

QUESTIONS PRESENTED.

Has the Federal Power Commission[3] general jurisdiction over Petitioner so as to render Petitioner subject to its Uniform System of Accounts and other accounting requirements as of the time of the entry of the order of the Commission on May 15, 1942, or at any time between August 26, 1935,[4] and May 15, 1942?

This Court has held that a corporation which owns facilities subject to the jurisdiction of the Commission under Part II of the Act is a "public utility" within the meaning of that term as defined in the Act. *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61. If Petitioner is such a "public utility", it is subject to the accounting orders of the Commission. Under Section 201 of the Act, if Petitioner owns facilities for "transmission of electric energy in interstate commerce" and if its facilities are not "facilities used in local distribution", it is such a public utility. In the *Jersey Central* case, the Court said (p. 72):

> "* * * Commission power does not extend over all connecting transmitting facilities but only over those

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[2] Hereinafter referred to as "the Act".

[3] Hereinafter referred to as "the Commission".

[4] The amendment to the Federal Power Act under which the Commission claims jurisdiction became effective on that day.

which transmit energy actually moving in interstate commerce. Mere connection determines nothing." [Italics ours.]

The only facilities of Petitioner which were held by the pinion of the Commission to be subject to its jurisdiction t the times of the hearing and of the entry of the order f May 15, 1942, were facilities in a substation in Bristol, Connecticut, used only in connection with local retail distribution by Petitioner in Bristol. They were connected with line of the Connecticut Power Company, from which Petitioner purchased electric energy, which line was connected with generating plants in Connecticut and also with lines onnected with generating plants at more distant points outside of Connecticut. Petitioner did not contract for any nergy generated outside of Connecticut, and the price hich it paid was dependent upon the cost of coal at a enerating plant of another company in Hartford, Connecticut, which contracted with Petitioner's vendor to upply Petitioner's demand at Bristol. Petitioner had no ontrol over the source of supply and had no occasion to etermine the source of supply at any time.

Petitioner contends that its facilities were not "facilities or transmission of electric energy in interstate commerce" ithin the meaning of Section 201 of the Act, and that, hether or not they were such facilities, they were exempt rom the jurisdiction of the Commission as "facilities used n local distribution" within the meaning of that Section.

Petitioner also contends that it was not shown that any nergy from outside of Connecticut reached the facilities f Petitioner, and that the Court of Appeals erred in refusng to weigh the evidence on this point and in holding that he only question was whether there was substantial evience to sustain the findings of the Commission.

Other contentions of Petitioner are indicated in this etition and the supporting brief.

STATUTE INVOLVED.

The statute involved is the Federal Power Act, and the principal sections of importance here are Sections 3, 201, 301(a), and 313(a) and (b), printed in the appendix, pp. 44-48, *infra*.

STATEMENT.

The Commission, after hearings on its order to show cause directed to Petitioner and on the answer of Petitioner thereto,[5] entered an order on May 15, 1942, which by reference incorporated specific findings of fact and also a discussion entitled "opinion". (R. 83) The Commission determined that Petitioner "was", during various specified periods since August 25, 1935, and "continues to be" a public utility subject to the jurisdiction of the Commission. (R. 63-82) The order requires Petitioner to comply currently with accounting requirements applicable to such public utilities.

On June 13, 1942, Petitioner filed a petition for rehearing and stay of order. (R. 1155) This was denied by the Commission on June 23, 1942. (R. 84) The Commission in the order denying the petition did, however, extend the time within which Petitioner should commence the studies and work necessary to comply with the order.

On August 18, 1942, Petitioner filed in the Court of Appeals a petition for review pursuant to Section 313(b) of the Federal Power Act. (R. 1) After hearing, the Court below[6] affirmed the order of the Commission (R. 1178) and later denied a petition for rehearing. (R. 1195)

This case involves the construction of the phrases in

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[5] The answer denied that Petitioner had been a public utility subject to the jurisdiction of the Commission, but admitted that its accounts had not been kept in accordance with accounting orders of the Commission applicable to public utilities subject to the jurisdiction of the Commission.

[6] The Court consisted of Mr. Justice Miller, Mr. Justice Arnold (who wrote the opinion) and Judge Dobie.

Section 201 quoted above and the application of these phrases to the facilities of Petitioner in four districts in which the Commission held Petitioner owned facilities subject to its jurisdiction. (R. 64-69) Three of these districts, the Bristol, East Hampton, and Torrington-Winsted districts, were districts in Connecticut, for which Petitioner purchased electric energy from other companies for local distribution. The fourth district was the Groton district, in Connecticut, in which Petitioner sold electric energy to the Borough of Groton, which in turn sold part of the energy to another company which transmitted it from Connecticut to Fishers Island, New York. Except at Bristol, all the facilities of Petitioner in these districts had, prior to the hearing before the Commission, been severed from any lines which were connected in any way with any lines running outside of the State. (R. 74)

There was no finding that Petitioner ever owned facilities subject to the jurisdiction of the Commission in any of the other areas which it serves with electric energy.

The territory served directly by Petitioner covers a substantial part of the State of Connecticut. It serves electric energy in 107 towns, cities, and boroughs, which have a total population of about 660,000, not including about 130,000 served by other Connecticut utilities purchasing substantially all of their electric requirements from Petitioner. (R. 86-87)

There is no dispute as to the ownership and operation by Petitioner of the facilities in question, but Petitioner contends, *inter alia*, that they were not facilities for transmission of electric energy in interstate commerce within the meaning of the Act, and that in all four of the districts mentioned, except in the Groton district, all of the facilities of Petitioner over which the Commission held that it had jurisdiction were "facilities used in local distribution" within the meaning of Section 201(b) of the Act.

It was established by uncontradicted evidence that since Aug. 26, 1935,[1] Petitioner has owned or operated no property outside of Connecticut. It has owned no line which crossed the Connecticut boundary. It has owned no line connecting at the Connecticut state line with the line of any other utility. It has had no contract with any party outside of the State of Connecticut for the purchase or sale of electric energy. It has had no contract to deliver electric energy outside of Connecticut, or to receive electric energy outside or from outside of Connecticut. It has not bought or sold any electric energy outside of Connecticut. It has had no contract or arrangement calling for delivery of electric energy to any other company or utility at the state line or for the receipt of energy from any other company or utility at the state line. (R. 119-125)

The theory of the Commission that in the Bristol, East Hampton and Torrington-Winsted districts Petitioner owned or operated facilities subject to the jurisdiction of the Commission was predicated upon the establishment of three conclusions: (1) that energy of Massachusetts origin at times supplied part or all of the loads of Petitioner, (2) that Petitioner in purchasing such energy or supplying it over its facilities to its customers transmitted electric energy in interstate commerce, and (3) that some of the facilities of Petitioner by which such energy was received by Petitioner and delivered to its customers were not used in local distribution.

There was no finding as to the amount of electric energy transmitted from Massachusetts which came to these facilities of Petitioner or what part of the total amount of electric energy coming to these facilities came from Massachusetts. The testimony supporting the findings of the Commission

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[1] The date upon which the amendment to the Federal Power Act became effective.

was limited to a comparatively few hours of each year. (R. 454-455, 543-557, Ex. 85, R. 1150-1151)

The facilities of Petitioner which the Commission held subject to its jurisdiction are indicated in red on the map which is appended hereto after p. 48. The Bristol, East Hampton, and Torrington-Winsted districts were not, during the respective periods when the Commission found the facilities subject to its jurisdiction, connected with the main system of Petitioner.

These three districts were supplied by energy from the so-called C.P. lines, with which all three of these districts were connected. The term "C.P. lines" is an abbreviation for "Connecticut Power lines," the lines being owned by the Connecticut Power Company.[8] These lines consist of two circuits which transmit energy at 66,000 volts. They are located wholly in the State of Connecticut and run from a bus at a substation of the Connecticut Power Company, in Hartford, in a westerly direction to a generating plant owned by the Connecticut Power Company at Falls Village, Connecticut, near the New York line. (Ex. 38; R. 686; see also Exs. 70 and 73)

That substation of the Connecticut Power Company is adjacent to the large steam generating plant of the Hartford Electric Light Company and other steam plants of that company. All of these plants are connected electrically with the C.P. lines. (R. 970)

For the Winsted district Petitioner purchased energy from the Torrington Electric Light Company, which obtained its supply either from its own plant or from the

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[8] The Connecticut Power Company is a corporation entirely separate from Petitioner. The Connecticut Power Company and the Hartford Electric Light Company, which is referred to hereafter, were not affiliated in any way with Petitioner. Petitioner owned no stock in either of these companies, and neither of them owned any stock in the Petitioner. No person who was at any time an officer or director of Petitioner served simultaneously in a similar capacity either the Connecticut Power Company or the Hartford Electric Light Company. (R. 975-976)

Connecticut Power Company. For the East Hampton and Bristol districts Petitioner purchased energy directly from Connecticut Power Company. (Ex. 8, R. 1039, Ex. 25, 1055; Ex. 11, R. 1044) These contracts contained no express provisions as to the source of the energy, but there was a provision that the unit charge for energy supplied should be adjusted on the basis of the cost of coal in the bunkers of the South Meadow plant of the Hartford Company in Hartford.

The Connecticut Power Company at all times had an understanding with the Hartford Electric Light Company under which the Hartford was obligated to supply such capacity as might be required, in addition to the capacity of the Connecticut Power Company's own water power plants, to carry the loads on the C.P. lines, including those at Bristol, at Middletown (which included the East Hampton area of Petitioner), and at Torrington (which included the Winsted district of Petitioner). This understanding was eventually embodied in formal contracts, the one relating to Middletown and Torrington being dated June 1, 1936, and the one relating to Bristol being dated June 8, 1937. (Exs. 30, R. 1063; 36, R. 1072; 37, R. 1081; R. 941-944, 961, 964-966)

The Commission based its conclusion as to the presence of out-of-state energy on Petitioner's facilities connected with the C.P. lines upon the fact that a 66,000-volt double-circuit line running from Agawam, Massachusetts, across the Connecticut-Massachusetts boundary was connected to the bus in the substation of the Connecticut Power Company, at Hartford, mentioned above. Through this line the Connecticut Power Company at times obtained electric energy which was generated outside of Connecticut through the operation of the so-called Connecticut Valley Power Exchange. (R. 686)

The companies which contracted to supply those loads of Petitioner which were connected with the C.P. lines (*i.e.*, those in the three districts under discussion) have at all times been able to obtain the necessary supply from generating plants located in Connecticut, and at no time were the combined loads of Petitioner in these three districts greater than the amount of electric energy generated contemporaneously by plants in Connecticut which were connected with the C.P. lines. (R. 949-953) If any Massachusetts energy reached Petitioner's facilities in these three districts, it had been transformed and divided for local distribution before reaching Petitioner's facilities. (R. 689-690, 699-700)

The Commission also found that until February 28, 1941, Petitioner owned facilities at or near Groton and Montville and between those places which were subject to the jurisdiction of the Commission. (R. 64, 65) Its finding was based on the fact that Petitioner sold electric energy to the Borough of Groton, most of which the Borough of Groton used for local distribution in Connecticut, but part of which it sold and delivered to another company which transmitted the energy from Connecticut to Fishers Island, New York, for local distribution there. (R. 64, 533) The amount of such energy which went to Fishers Island was only about 1/5 of 1% of the total amount of energy generated and received by Petitioner, and no energy generated or transmitted by Petitioner has gone to Fishers Island since February, 1941. (R. 835-836, 196-197) All of the energy which went to Fishers Island had been transformed before leaving Connecticut. (R. 199-203)

The Court of Appeals held, without discussion of the legal principles involved, that in each of the four districts Petitioner had facilities "for transmission of electric energy in interstate commerce".

The Court did not discuss the question whether the facilities by which Petitioner distributed energy in the Bristol, East Hampton and Torrington-Winsted districts should be classified as local, saying that it was not relevant to the case. This conclusion was based upon its construction of the Act to the effect that the last sentence of Section 201(b) of the Act does not exempt from the jurisdiction of the Commission a company which owns only facilities used in local distribution. The Commission itself in its opinion in this case did not adopt or suggest this construction, and as far as we are aware its attorneys had not urged this construction of the Act until recently.

The Court of Appeals held, without discussion of its duty to weigh the evidence, that as to the questions of fact the sole question was whether the findings of the Commission were "sustained by substantial evidence", and it concluded that there was substantial evidence that energy generated in Massachusetts reached facilities of Petitioner in Connecticut at its East Hampton, Torrington-Winsted and Bristol districts.

The Court also held that the facilities of Petitioner at or near Groton had been subject to the jurisdiction of the Commission, but recognized the fact that after February, 1941, this was no longer the situation. In discussing the Groton situation, it made no mention of the contention of Petitioner that, under proper construction of the statute, sales to a municipal corporation could not be the basis of jurisdiction of the Commission.

The Court gave no particular attention to the fact that the status of Petitioner may have changed after the effective date of the Act but before the hearings and determination of the Commission. Its decision seems to rest in large part upon the fact that Petitioner discontinued its arrangements and connections with the Connecticut Valley Power Exchange prior to the effective date of the Act.

SPECIFICATION OF ERRORS.

The Court of Appeals for the District of Columbia erred:

1. In holding that Petitioner *is* a "public utility" subject to its jurisdiction under the Act, *i.e.*, as of the date of the Commission's determination, and in affirming the order of the Commission requiring current compliance with its accounting orders and system of accounts at the time of the making of its determination and for the future. And specifically in holding that any facilities of Petitioner in its Bristol district are facilities for "transmission of electric energy in interstate commerce" within the meaning of §201 of the Act, and in refusing to hold that all facilities in the Bristol district were exempt from the jurisdiction of the Commission as "facilities used in local distribution".

2. In affirming the order of the Commission insofar as such order was based upon the Commission's determination that Petitioner *was* such a "public utility" subject to its jurisdiction under the Act during past periods, by reason of Petitioner's ownership and operation of facilities for the receipt and distribution of electric energy in its Bristol, East Hampton or Torrington-Winsted districts. And specifically in holding that any facilities of Petitioner in these districts were facilities for "transmission of electric energy in interstate commerce" within the meaning of §201 of the Act, and in refusing to hold that all facilities in these districts were exempt from the jurisdiction of the Commission as "facilities used in local distribution".

3. In holding that a company is such a "public utility", subject to the general jurisdiction of the Commission under the Act, even though its only facilities over which flows electric energy generated in another State are facilities "used in local distribution".

4. In affirming the order of the Commission insofar as such order was based on the Commission's determination

that Petitioner was a "public utility" under the Act, during a past period, by reason of Petitioner's ownership and operation of facilities for the sale and delivery of electric energy to the Borough of Groton. And specifically in holding that any such facilities were facilities for "transmission of electric energy in interstate commerce" or for "the sale of electric energy at wholesale in interstate commerce" within the meaning of § 201 of the Act; in refusing to hold that all such facilities were exempt from the jurisdiction of the Commission because used in sales to a municipal corporation; and in refusing to hold that the amount of energy which was transmitted to Fishers Island was so negligible that it must be disregarded.

5. In determining Petitioner's status under the provisions of the Act, by reference to Petitioner's acts in separating itself from the Connecticut Valley Power Exchange prior to the effective date of the 1935 amendments to the Act, and further in determining Petitioner's status under the Act by the application of standards which are not contained in the Act or in any other applicable statute.

6. In holding that the Court was under no duty to weigh the evidence in regard to jurisdictional facts and to make its own determination thereon. This was based upon improper construction of the statute, or, if its construction of the statute was correct, the statute is unconstitutional—

(a) In that it deprives Petitioner of property without due process of law in violation of the provisions of Article V of the Amendments to the Constitution of the United States;

(b) In that it curtails the powers of the Judiciary in violation of the provisions of Article III of Section 2 of the Constitution; and

(c) In that it confers on the United States a power reserved to the State of Connecticut.

REASONS FOR GRANTING THE WRIT.

1. The construction of the term "facilities for transmission of electric energy in interstate commerce" in Section 201 of the Federal Power Act adopted by the Court of Appeals and its construction of the last sentence of Section (b) thereof to the effect that ownership merely of facilities used in local distribution may subject the owner to the jurisdiction of the Commission are, we submit, not justified. The constructions adopted bring about results not intended by the Congress which enacted the statute, as disclosed by its legislative history. (See pp. 21-22, 28-31, *infra*.) These questions are questions of substance relating to the construction of a Federal statute and of general importance, which have not been, but should be, settled by this Court; and they have not been raised in any case in this Court, either on the merits or on petition for certiorari.

If Petitioner is subject to the jurisdiction of the Commission because of its facilities at Bristol, this would result only because it happens that, without Petitioner's having any control of the matter, some of the energy which Petitioner purchases solely for local distribution there, comes from a company whose lines, served by generating plants in Connecticut, also connect with lines of other companies which in turn are connected with generating plants outside of Connecticut. And, under the holding here, it makes no difference (1) that the price of the energy is based solely upon costs pertaining to generation in the State, or (2) that the generating plants in the State with which the lines are connected are sufficient to supply Petitioner's demand, and actually did at all times contemporaneously generate a sufficient supply to satisfy its demands. If such a company is subject to the general jurisdiction of the Commission, it is difficult to conceive of any ground for exempting from the jurisdiction of the Commission any small local distributing

company whose facilities are connected with lines which are ultimately connected with other lines leading eventually to generating plants outside of the State. It is clear, however, that Congress did not intend to subject companies to the jurisdiction of the Commission merely because they have facilities connected to parts of a system of power transmission situated in more than one State. (See pp. 21-22, 28-31, *infra*.) The facilities and rates of such local companies are subject to State regulation. The purposes of the Act will be fulfilled if, as here, the Commission has jurisdiction over the company which has an interstate line and its predecessors in the chain of power generation and transmission. *It is unnecessary and* unjustifiable to extend the Commission's jurisdiction to every company which receives energy from such company or from other companies which subsequently purchase energy from such company.

On the basis of the holding below, it seems highly probable that innumerable small companies would be subject to the jurisdiction of the Commission. A survey made by the Edison Electric Institute indicates that there are over 1000 small companies which buy energy from larger systems, the supply of almost all of which may have some component from an interstate source, and that there is some such small company in each of 46 different States.

If a company is subject to the jurisdiction of the Commission because of the ownership of facilities subject to the jurisdiction of the Commission, even though such facilities may constitute but a minute portion of its property and may be located in one isolated place, the company is subject to the jurisdiction of the Commission in general, and whether large or small it must keep its accounts for all parts of its system in accordance with the orders of the Commission.[9] It must, upon request of the Commission, make an inventory of all or any part of its property with a statement of the original cost thereof, and it must keep

[9] Section 301.

the Commission informed regarding the cost of all additions, betterments, extensions, and new construction.[10] It must file such annual and other periodic or special reports as the Commission may order.[11] It must keep its depreciation accounts for all parts of its system as the Commission may require.[12] It may not sell, lease, or otherwise dispose of any of its facilities of a value in excess of $50,000, or merge or consolidate such facilities without having first secured an order of the Commission authorizing it to do so.[13]

It is consequently apparent that the effect of the decision here will be to subject the entire accounts, plants, and almost all of the affairs of many large companies to the jurisdiction of the Commission merely because *small parts of their* facilities are connected with lines which are connected with other lines which in turn are connected with generating plants outside of the State, and that it will also subject to the jurisdiction of the Commission innumerable small companies which happen to be so connected, even though none of the rates of such companies (large or small) is subject to the jurisdiction of the Commission. It is hard to conceive of a holding which would have a wider effect upon the scope of the jurisdiction of the Commission and which would impose greater trouble or expense upon utility companies.

2. The net effect of the holding of the Court below conflicts, as a practical matter, with the principle stated in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61, 72, *supra*, that "mere connection determines nothing".

3. The decision of the Court below conflicts with the view

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[10] Section 308(b).
[11] Section 304(a).
[12] Section 302(a).
[13] Section 203(a).

of the Circuit Court of Appeals for the Third Circuit as expressed in the following language from its opinion in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 129 F. 2d 183, 194:

> "As we have said Section 201(a) of the Act states explicitly that the federal regulation proposed by the Act is intended 'to extend only to those matters which are not subject to regulation by the States', and that Section 201(b) says with equal clarity that *the Commission 'shall not have jurisdiction* • • • over facilities used for the generation of electric energy or *over facilities used in local distribution* or only for the transmission of electric energy in intrastate commerce, • • •.' Generation of electricity, *its local distribution* or its transmission in intrastate commerce are not within the purview of the Act or the jurisdiction of the Commission." [Italics ours]

4. The decision of the Court in this case that interstate commerce was carried on over the facilities of Petitioner is in conflict with the decisions of this Court in *Public Utilities Comm.* v. *Landon*, 249 U.S. 236; *Missouri* v. *Kansas Gas Co.*, 265 U.S. 298; *Lone Star Gas Co.* v. *Texas*, 304 U.S. 224; and *Banker Bros. Co.* v. *Pennsylvania*, 222 U.S. 210. In holding that the transformation of the energy and division of the same for local distribution did not terminate the interstate journey of the energy, the decision below is also in conflict with that in *South Carolina Power Co.* v. *South Carolina Tax Commission*, 52 F. 2d 515, aff'd 286 U.S. 525; 60 F. 2d 528, aff'd *sub nomine Broad River Power Co.* v. *Query*, 288 U.S. 178.

5. Construction and application of the statute as requiring appellate courts merely to ascertain whether there was substantial evidence to support the findings as to jurisdictional facts conflicts with *Crowell* v. *Benson*, 285 U.S. 22; *St. Joseph's Stock Yards Co.* v. *United States*, 298 U.S.

38, 51-52; and *Bradley Lumber Co.* v. *National Labor Relations Board*, 84 F. 2d 97, 100 (C.C.A. 5th), cert. den. 299 U.S. 559.

WHEREFORE it is respectfully submitted that the petition should be granted.

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Of Counsel.

JUNE, 1944.

In the

Supreme Court of the United States.

OCTOBER TERM, 1943.

No.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

BRIEF IN SUPPORT OF PETITION FOR CERTIORARI.

For statement of the case and also statements as to the opinions below, jurisdiction, questions presented, statute involved, and specification of errors, we refer to the foregoing petition. Some further statements of fact are made in the argument in this brief.

In *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61, this Court said:

> "* * * The language of section 201(a) and (b) indicates a distinction between the facilities for generation or production and those for transmission. Also, it is sales at wholesale only which are regulated and, finally, Commission power does not extend over all connecting transmitting facilities but only over those *which transmit energy actually moving in interstate*

commerce. Mere connection determines nothing. [*Italics ours.*]

* * * * * * *

"* * * The business of transmitting and selling electric energy is said to be affected with a public interest and federal regulation of a portion of that business is declared necessary. Section 201(a). The fact that a company is engaged in this business is not determinative of its inclusion in this act. The determinative fact is the ownership of facilities used in transmission. Such use makes the owner or operator of such facilities a public utility under the act (e). * * *"

The problem, then, is to determine whether Petitioner had facilities of the kind which the statute prescribes as the basis of its jurisdiction.

ARGUMENT.

A.

PETITIONER HAS OWNED OR OPERATED NO FACILITIES SUBJECT TO THE JURISDICTION OF THE COMMISSION IN ANY OF THE THREE AREAS WHICH WERE CONNECTED WITH THE C.P. LINES, i.e., EAST HAMPTON, BRISTOL OR TORRINGTON-WINSTED.

As to each of these areas Petitioner was a distributing company which did not itself transmit energy interstate, but which purchased for local retail distribution energy which came to it over the C.P. lines owned by the Connecticut Power Company, and some of this energy, according to findings of the Commission, the Connecticut Power Company had transmitted from Massachusetts.

As we have pointed out, contracts called for a supply from these three districts from generating plants in Connecticut and since the billing to Petitioner was based on

production cost at a steam generating plant in Hartford, Connecticut, Petitioner had no reason to concern itself with any possible flow of energy from Massachusetts. At no time were the combined loads of Petitioner in these districts greater than the amount generated contemporaneously by plants in Connecticut with which these loads were connected.

We contend that all of the purposes of the Act are fulfilled if, as here, the company which did transmit energy across the State line, i.e., the Connecticut Power Company, is subject to the jurisdiction of the Commission, and that it was not the intention of Congress to submit a local distributing company to the jurisdiction of the Commission merely because the supply which it purchased and received in the State and used in local distribution there happened to include some energy generated in another State.

I.

NO FACILITIES OF THE PETITIONER IN THESE AREAS WERE FACILITIES "FOR THE TRANSMISSION OF ELECTRIC ENERGY IN INTERSTATE COMMERCE" WITHIN THE MEANING OF THE ACT.

Section 201(a) of the Act stipulates that the Federal regulation which the Act confers is "to extend only to those matters which are not subject to regulation by the States". In the report of the Committee on Interstate Commerce submitted to the Senate by Senator Wheeler (Senate Report No. 621, 74th Congress, First Session, p. 18) it is stated:

> ". . . The revised bill would impose Federal regulation only over those matters which cannot effectively be controlled by the States."

As appears from the legislative history of the Act, the ultimate purpose of Congress was to confer upon the Commission jurisdiction over transactions and facilities which

had been held to be beyond the reach of State power, as Congress understood the decision in *Attleboro Steam & Electric Co.* v. *Public Utilities Commission*, 273 U.S. 83. Clearly, Congress did not intend to submit to the jurisdiction of the Commission all facilities connected to "parts of a system of power transmission situated in more than one State" for the bill as it originally passed the Senate contained such a phrase, but this was deliberately changed, and in the bill as finally passed those words were intentionally omitted. The legislative history of the Act is set forth in some detail in the dissenting opinion in *Jersey Central Company* v. *Federal Power Commission*, 319 U.S. 61, 85-88, and in *Jersey Central* v. *Federal Power Commission*, 129 F. 2d 183, 193-194, to which for convenience we hereby refer.

We contend that, regardless of all other considerations, transmission in interstate commerce ended at least as soon as the energy reached the facilities of Petitioner, and consequently the facilities of Petitioner did not transmit energy moving in interstate commerce.

As Petitioner was a distributing company which did not itself transmit energy interstate, the situation here is like that discussed in *Missouri* v. *Kansas Gas Co.*, 265 U.S. 298, 308, in which the Court, speaking of the transportation of gas in a pipe line across a state line and delivery to distributing companies which then sold and delivered it to local customers, said: "With the delivery of the gas to the distributing companies, however, the interstate movement ends." In that case the Court also said (p. 309): "The business of supplying, on demand, local consumers is a local business, even though the gas be brought from another State and drawn for distribution directly from interstate mains; * * *"

The situation here is also similar to that presented in such cases as *Lone Star Gas Co.* v. *Texas*, 304 U.S. 224;

South Carolina Power Co. v. *South Carolina Tax Commission*, 52 F. 2d 515 (E.D. S.C. 1931), aff'd 286 U.S. 525; 60 F. 2d 528, aff'd *sub nomine Broad River Power Co.* v. *Query*, 288 U.S. 178; *Public Utilities Comm.* v. *Landon*, 249 U.S. 236; *Banker Brothers Co.* v. *Pennsylvania*, 222 U.S. 210. See also *Southern Gas Corp.* v. *Alabama*, 301 U.S. 148, 154-155.

The companies which contracted to supply those loads of Petitioner which were connected with the C.P. lines (*i.e.*, those in the three districts under discussion) have at all times been able to obtain the necessary supply from generating plants located in Connecticut. (R. 949-953, 969-972)

Consequently, it is clear that the State Commission had jurisdiction over those contracts and over all of the facilities of Petitioner in those areas. *Peoples Gas Co.* v. *Pub. Serv. Com.*, 270 U.S. 550; Connecticut G. S. Rev. of 1930, Section 3599*; *New Haven* v. *New Haven Water Co.*, 118 Conn. 389, 172 A. 767.

As appears from the language of the Act itself and its legislative history, Congress intended to preserve jurisdiction of the state over such contracts and such facilities and

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*In this connection attention is called to Section 1414(c), Cumulative Supplement to General Statutes of Connecticut. This Act, which was approved and became effective on May 29, 1935, as Chapter 191 of the Public Acts, 1935, states that its general purposes "are to assure to the State of Connecticut its full power to regulate its public service corporations", etc.

Section 6 of this Chapter [Cumulative Supplement (1935) 1414(c), cl. f, p. 592] contains the following provision:

> "• • • No gas, electric or water company, or holding company, or any official, board or commission purporting to act under any governmental authority other than that of this state or of its divisions, municipal corporations or courts, shall interfere with or attempt to interfere with or exercise authority or control over any gas, electric or water company incorporated by this state and engaged in the business of supplying service within this state, or with or over any holding company

not to bestow jurisdiction over the contracts or the facilities upon the Federal Power Commission.

Another reason why the interstate movement of any electric energy coming from Massachusetts had ceased before it reached Petitioner's facilities in the East Hampton and Torrington-Winsted areas is that before reaching them it had been transformed and divided for local distribution. (R. 689-690, 699-700)

It has been held where electric energy is transmitted into a state and put through a transformer in order to render the energy suitable for local customers that the effect of a transformer is to terminate the interstate journey of the energy. *South Carolina Power Co.* v. *South Carolina Tax Commission*, 52 F. 2d 515, at pp. 524-525; aff'd 286 U.S. 525.

The transformer involved in that case evidently operated in the same manner as those here involved, as transformers have not changed in principle in recent years. (R. 616)

The transformers here involved lowered the tension and "converted and reshaped" the energy "so as to give it new characteristics." (R. 614, 874-877) The treatment of the energy in passing through them is consequently similar to the treatment and division of a large compressed volume of gas when it is relieved of most of the pressure put upon it, and it is consequently, as the Court said in *East Ohio Gas Co.* v. *Tax Commission*, 283 U.S. 465, 471: "like the breaking of an original package, after shipment in in-

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incorporated by this state and doing the principal part of its business within this state, without having first obtained the approval of the commission, except as the United States may properly regulate actual transactions in interstate commerce. Any action contrary to the provisions of this section shall be voidable on order of the commission."

terstate commerce, in order that its contents may be treated, prepared for sale and sold at retail."

The fact that the journey of electric energy from generator to consumer is virtually instantaneous does not determine the question whether energy is in interstate or intrastate commerce at any given point in that journey. As the Court said in *Southern Pacific Company* v. *Gallagher*, 306 U.S. 167, 177: "'Practical continuity' does not always make an act a part of interstate commerce." And the Courts have had no difficulty in dividing the journey of electric energy for jurisdictional purposes. See *Utah Power & Light Co.* v. *Pfost*, 286 U.S. 165, 179; *South Carolina Power Co.* v. *South Carolina Tax Commission*, 52 F. 2d 515, 524-525.

II.

THE FACILITIES OWNED OR OPERATED BY PETITIONER IN THESE THREE AREAS WERE "FACILITIES USED IN LOCAL DISTRIBUTION", AND THEREFORE WERE EXEMPT FROM THE JURISDICTION OF THE COMMISSION.

Section 201 (b) of the Federal Power Act provides:

> ". . . The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter."*

We contend that whether or not any facilities of Petitioner were facilities "for transmission of electric energy

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*Act of August 26, 1935, C. 687 (49 Stat. 847), U.S.C. Title 16, § 824(b).

in interstate commerce", they were "used in local distribution" and therefore Petitioner was exempt from the jurisdiction of the Commission.

The Commission seems to have recognized in its opinion that certain facilities would be exempt under the language of the statute quoted above. This is apparent from the discussion in its opinion (R. 75-78) and the fact that it made specific findings as to which facilities in each of the three areas it regarded as "used for the transmission of electric energy * * * as distinguished from local distribution thereof." See paragraphs (10), (14), and (18) of the findings. (R. 66-69)

The discussion in that opinion and the findings show, however, that the Commission took too narrow a view of the scope of the exemption of facilities "used in local distribution", which it confined to facilities in the system beyond the point where "the process of subdividing the energy to serve ultimate customers, which [it said] is the characteristic of 'local distribution', is begun." (R. 75) Thus it excluded from the excepted category various facilities of Petitioner beyond the point where it received the electric energy from the Connecticut Power Company, and classified as facilities not used for local distribution not only certain lines between Torrington and Winsted and in the East Hampton area, but also the substations in those areas which lowered the voltage, and also the facilities in the substation in the heart of Bristol. (R. 66-69)

In the Court of Appeals Petitioner contended that the Commission in reaching these conclusions erred as a matter of law in construing the statute, and also that insofar as its findings are findings of fact they were not sustained by the weight of the evidence, as to which the Court must make its own independent determination.

Petitioner contended that as a matter of law the excep-

tion must be construed as embracing all the facilities owned by it beyond the point of delivery of the electric energy to it as a distributing company and, in the alternative, that if such a definition of the term "used in local distribution" is not warranted, this phrase must include all facilities whose functions are intimately connected with distribution. Certainly the phrase is no narrower than the one making the exception immediately following in the statute, *i.e.*, facilities "only for the transmission of electric energy in intrastate commerce." Whatever may be the power of Congress to place under the jurisdiction of a Federal agency facilities such as the local facilities under discussion, here Congress did not attempt to include the facilities which were only incidentally connected with interstate commerce. It seems clear that it did not intend to submit to Federal jurisdiction facilities beyond the point where the interstate movement ended under the concept of interstate commerce which was in effect at the time of the passage of the Act in 1935.

The Court below, however, declined to consider any of these contentions. It held that Petitioner's contention that jurisdiction over accounts and the like could not be based solely upon facilities in local distribution was unsound, and that the language of the Act quoted above did not operate as an exemption, but was "intended to make it clear that this jurisdiction extends even to local facilities where the Act provides for their regulation, as it does in the case of accounting practices", and went on to say, "Therefore, whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as local is not relevant to this case." (R. 1175)

The Court admitted that the construction for which Petitioner contended was a "grammatical possibility", but based its conclusions upon considerations which, we sub-

mit, totally lost sight of the structure of the Act and its legislative history.

The provision for "accounting practices", on which the Court relied, cannot of itself submit facilities of a company or its accounts to the jurisdiction of the Commission. This provision appears in Section 301 of Part III. But in determining whether the Commission has any jurisdiction over a company, Part III does not control, inasmuch as Section 201(e) in Part II provides:

> "The term 'public utility' when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under *this* Part." (Emphasis ours)

Facilities for local distribution are nowhere specifically mentioned in other sections of "this Part", *i.e.*, Part II of the Act. Thus it is clear that Petitioner is not a "public utility" subject to the jurisdiction of the Commission solely because facilities used in local distribution may be governed by the accounting requirements applicable to a "public utility".

The matter is definitely and clearly summarized in the extract from the opinion in *Jersey Central Power & L. Co.* v. *Federal Power Commission*, 129 F. 2d 183, 194, quoted on p. 16, *supra*.

The legislative history of the Act demonstrates clearly that Congress did not intend to extend Federal jurisdiction to all facilities connected to "parts of a system of power transmission situated in more than one state" (from which the original bill excepted facilities for "retail distribution"),* that continual efforts were made to narrow the basis of jurisdiction originally proposed, and that the ultimate intention was to exclude "facilities used in local dis-

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*S. 1725, 74th Cong. 1st Sess., February 6, 1935.

tribution" from the categories of facilities subjecting a company to the general jurisdiction of the Commission.

The provision for jurisdiction over facilities in Section 201(a) of the Bill as reported to the Senate by the Senate Committee (designated S. 2796) and as the Bill passed the Senate was as follows:

> "The Commission shall have jurisdiction over all facilities for such production, transmission, or sale of electric energy by any means and over all facilities connected therewith as parts of a system of power transmission situated in more than one State, except facilities used only for the production or transmission of electric energy in intrastate commerce or in local distribution or for the use of the producer or transmitter."*

This, it is clear, specifically excepted from the jurisdiction of the Commission "facilities used in local distribution".

The House Committee on Interstate and Foreign Commerce rewrote certain provisions of the Bill and reported it to the House (S. 2796 with amendments, Report No. 1318, House of Representatives, 74th Congress, 1st Session). As so reported, the clause applying to "facilities used in local distribution" was the same as in the Act finally passed, except that it did not contain the words "except as specifically provided in this Part and the Part next following." The House enacted the clause as reported.

It is clear that the House did not intend to confer jurisdiction of the Commission over a company because of ownership of facilities used in local distribution. The Re-

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*Jersey Central Power & L. Co. v. Federal Power Commission, 129 F. 2d 183, 193.

port of the House Committee contained the following language (p. 27):

> "As in the Senate bill no jurisdiction is given over local distribution of electric energy, and the authority of States to fix local rates is not disturbed even in those cases where the energy is brought in from another State."

Throughout the discussion on the floor of the House there appear abundant manifestations of Congressional purpose to preserve to the States the powers which they then had. See 79 Cong. Rec. Part 9, pp. 10357, 10377, 10378, 10384-10387, and Part 10, 10574.*

Owing to the differences between the bills passed by the two Houses, the matter was referred to conferees.

They inserted the phrase "except as specifically provided in this Part and the Part next following." This is the first time this phrase appears, and the Report of the House conferees accompanying the Conference Report (74th Congress, 1st Session, House Report No. 1903, p. 74) asserts that it is merely "a clarifying phrase added to remove any doubt as to the Commission's jurisdiction over facilities used for the generation and local distribution

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*Moreover, when the Federal Power Act was under discussion upon the floor of the House, Representative Cole of Maryland, a member of the Committee on Interstate and Foreign Commerce, said of the provisions of Part II that the Committee had "tried—and I think successfully—to avoid . . . the extension thereof [of Federal control] into intrastate activities in the way that the Shreveport case might permit." 79 Cong. Rec. Part 9, 10384.

The familiar doctrine of the Shreveport case (*Houston, East & West Texas Railway Co.* v. *United States*, 234 U.S. 342) is that the Interstate Commerce Commission can properly regulate intrastate railroad rates where they are so low as to discriminate against and work direct injury to interstate commerce. That is the doctrine which Congress intended should *not* be applied in interpreting the powers of the Federal Power Commission.

of electric energy to the extent provided in *other* sections of this part and the part next following." (Emphasis ours) In the light of this statement and the fact that there was no dispute between the House and the Senate as to the provision regarding local distribution, it is clear that this clause was not intended to enlarge the basis of general jurisdiction of the Commission as previously limited.

As we have pointed out above, in determining the general jurisdiction of the Commission the Part next following, *i.e.*, Part III (in which the accounting provisions appear) must be disregarded.

III.

THE COURT BELOW ERRED IN REFUSING TO WEIGH THE TESTIMONY AS TO JURISDICTIONAL FACTS.

Petitioner contended in the Court below that the findings of the Commission to the effect that Petitioner purchased electric energy for three areas connected with C.P. lines which "regularly, frequently and over substantial periods of time" included electric energy in substantial amounts transmitted from Massachusetts could not stand.

As facilities are not subject to the jurisdiction of the Commission unless they transmit "energy actually moving in interstate commerce", it follows that unless it is proved that energy from outside of the state did reach Petitioner's facilities they are not subject to the jurisdiction of the Commission.

Section 313(b) of the Federal Power Act provides, "The findings of the Commission as to the facts, if supported by substantial evidence, shall be conclusive."

In this connection it should be borne in mind that it is expressly stipulated in Section 313(b) of the Federal Power Act, which provides for review by the Courts, that upon the filing of the transcript therein, "such court shall have exclusive jurisdiction to affirm, modify or set aside

such order, in whole or in part", and that the statute contains no other provision for challenging the order of the Commission or any finding of fact upon which it is based.*

The statute should not be construed in such a way as to raise grave doubt as to its constitutionality. If the statute be construed to require the reviewing courts merely to ascertain whether there was some substantial evidence to support the findings as to *jurisdictional facts*, leaving Petitioner without any independent judicial review of these facts, it would be unconstitutional. See *Crowell* v. *Benson*, 285 U.S. 22, and other cases cited in the petition.

In the Court below we made these contentions, but the Court entirely disregarded them and said merely that the question was whether the finding of the Commission was sustained by substantial evidence. A petition for rehearing again set forth these contentions. (R. 1180-1181) The petition was, however, denied without opinion. We submit that the decision of the Court below on this point conflicts with the cases cited and that this is sufficient reason for granting certiorari and reversing the decree of the Court below. Although it does not seem desirable here to discuss the evidence in detail, we wish to point out that the Court below seems to have misunderstood the evidence and our contentions in regard to the evidence.

Thus the opinion states that the statute "makes the test of whether such energy is actually transmitted between the two States the simple and practical one of reading a meter" (R. 1176), but the evidence demonstrated clearly that in the situation which obtained here the reading of a meter would not show the source of the energy.

The facilities of the Petitioner in question were at all times connected with generating plants in Connecticut

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*Act of August 26, 1935, C. 687 (49 Stat. 860), U.S.C. Title 16, § 825*l*(b).

which contemporaneously generated more than the combined loads of these three areas of the Petitioner. (R. 949-953) As the engineer of the Commission admitted, there were no meters which showed the source of the energy which reached the facilities of the Petitioner.* The generating plants in Connecticut were nearer these loads of the Petitioner than were the generating plants in Massachusetts. (See R. 1113) In these circumstances we contend

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*The following are extracts from the testimony of the Commission's engineer, Thomas (R. 601-603):

"Q. Now, I think that you testified in effect that there were instruments for determining the flow of energy and the rate of flow that you designated as watt-meters or watt-hour meters; is that correct? A. I remember stating that.

"Q. Such meters, of course, do not show the source of the energy, do they? A. Well, the meter itself doesn't have a marking on it to show where it came from. In Mr. Miller's case, the meter doesn't show red and blue or anything of that sort.

"Q. And of course there is not at Bristol or Winsted or any of the East Hampton District any instrument which shows the source of the energy that was received there at any time? A. No, not that you can determine from the reading on the instrument.

"Q. And as a matter of fact it is impossible by examining or by any other observation that you can make of energy at a particular point, to know where it is generated? A. I think that is correct.

• • •

"Q. Let me ask you a specific question. Let us assume that there is energy put on the CP line No. 1 from Falls Village, and there is also energy put on that line from Hartford. There is no physical observation or no reading of any meter on that line that would enable you to determine at any particular point what proportion of the energy came from one source and what from the other? A. Well, the instruments that are put on the line are only intended to read the total. So, of course—

"Q. And the— A. So, of course, they wouldn't indicate parts. They are not intended for that purpose."

that, as distinguished experts testified, there was no established principle by which energy reaching the facilities of the Petitioner could be identified as coming from Massachusetts. (R. 772-776, 864-865, 873)

We did not suggest, as the opinion implies, that there was any "distinction between electric current as measured on a meter and electric energy * * * within the contemplation of Congress when it passed the Act."

B.

PETITIONER WAS NOT SUBJECT TO THE JURISDICTION OF THE COMMISSION BECAUSE OF ANY SALE MADE TO THE BOROUGH OF GROTON OR FACILITIES FOR TRANSMISSION IN CONNECTION THEREWITH.

Petitioner has sold electric energy at wholesale to the Borough of Groton, a municipal corporation in Connecticut. This Borough has the charter right to carry on the business of distributing power within certain limits. (Finding, R. 64; see also R. 168, 169, 171-173, 180; Ex. 77, R. 1148)

After delivery of the energy to the Borough of Groton, some of it was distributed to numerous customers of the Borough located on its distribution system in Connecticut. Some of the rest was transformed from 33,000 volts, at which it was delivered, to 6600 volts at a substation owned by the Borough and then at another substation owned by the Borough some of it was transformed to 2300 volts. Part of the energy going to this point was distributed to local customers in Connecticut and the rest went to a substation connected with cables going to Fishers Island, New York. None of the facilities between the substation first mentioned and Fishers Island was owned by Petitioner. (R. 100-101, 180-182, 199-203, 206, 532-533)

The energy purchased by the Fishers Island Company* from the Borough amounted to about one-third of the total amount of energy purchased by the Borough from Petitioner, but to only about 1/5 of 1% of all of the energy supplied by Petitioner in each year to all of its customers. (R. 216, 834-835)

The energy was purchased by the Borough of Groton from Petitioner under contracts which made no mention of sale of the energy by the Borough to the Fishers Island Company, but Petitioner knew that some of the energy was being supplied by the Borough to the Fishers Island Company. (R. 93-107, 193)

In February, 1941, prior to the hearing before the Commission, connections were cut and facilities were dismantled so that transmission to Fishers Island was no longer possible. (R. 196-197, 209-215, 608)

We submit that the sales to Groton and the facilities used in connection therewith did not submit Petitioner to jurisdiction of the Commission for three distinct reasons.

I.

THE INTERSTATE MOVEMENT TO FISHERS ISLAND DID NOT BEGIN UNTIL AFTER THE ENERGY LEFT THE FACILITIES OF PETITIONER AT GROTON.

As has been pointed out above, in Groton, Connecticut, the energy was greatly reduced in voltage by transformers owned by the Borough and was subdivided extensively for local distribution. It was only after it had passed through these transformers and various other facilities of the Borough that it was delivered to Fishers Island Company and then transmitted by that company to New York.

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*"Fishers Island Company" is employed throughout this brief to denote the corporation engaged at the corresponding period of time in purchasing electric energy from the Borough of Groton for supply to Fishers Island.

We consequently submit that under the principles mentioned on pp. 24-25, *supra*, the interstate movement cannot be considered as beginning until after the energy left the facilities of Petitioner in Groton.

II.

THE AMOUNT OF ENERGY WHICH WAS TRANSMITTED TO FISHERS ISLAND WAS SO NEGLIGIBLE THAT IT MUST BE DISREGARDED.

The territory served directly by Petitioner covers a substantial part of the State of Connecticut. It serves electric energy in 107 towns, cities, and boroughs, which have a total population of abut 660,000, not including about 130,000 served by other Connecticut utilities purchasing substantially all of their electrical requirements from Petitioner. (R. 86-87)

The amount of energy which was transmitted to Fishers Island was only about 1/5 of 1% of all the energy generated and received by Petitioner. But if the sales to Groton or the transmission facilities used in them are held subject to the jurisdiction of the Commission, the result is not merely to submit these particular sales and facilities to the jurisdiction of the Commission, but, as pointed out in the foregoing petition, to submit a very large part of the activities of Petitioner's entire business to the jurisdiction of the Commission. Among other things this will require compilation of an inventory of all of its property with a statement of the original cost thereof, a tremendous undertaking which it is estimated will involve an expense of about $400,000.

It is incredible that Congress intended to give the Commission such jurisdiction over a company because it had facilities which were used in connection with such an infinitesimal part of its business. The Court in the *Jersey Central* case appears to have recognized that the *de mini-*

is rule might be applicable to such a situation. (Footnote of the majority opinion.)

The Court below also seemed to recognize that the *de minimis* rule might be applicable to such a situation, but it refused to apply it because it concluded that the history of Petitioner's operations removed all doubt as to its "essentially interstate character", and indicates that the business of Petitioner was not normally an intrastate business.

This, we submit, reveals a complete misunderstanding of the nature of Petitioner's business. Although prior to the passage of the Act some of its generating plants were connected with lines which transmitted energy to Massachusetts, the production of energy for use in Massachusetts was only a small part of the business of Petitioner, which generated large amounts of energy and transmitted them from its generating plants to about 100 towns, cities, and boroughs which it served with electricity. Before the Act went into effect, the connection of its generating plants with the lines going to Massachusetts was severed, and after that if Petitioner was engaged in interstate business at all it was only because of the extremely small amount of energy supplied indirectly to Fishers Island, New York, and because of the fact that some of the energy which it received from the Connecticut Power Company happened to come from sources in Massachusetts, although Petitioner contracted for no energy from such sources.*

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*As indicated above, Petitioner had no occasion to determine whether any electric energy was received from Massachusetts, and we contend that it has not been shown that it did receive such energy after the Act went into effect in 1935.

III.

THE FACT THAT THE BOROUGH OF GROTON IS A MUNICIPAL CORPORATION PREVENTS SALES OF PETITIONER TO IT FROM SUBJECTING PETITIONER TO THE JURISDICTION OF THE COMMISSION.

Section 201(b) of the Act confers jurisdiction over "the sale of electric energy at wholesale in interstate commerce . . .", and Section 201(d) defines the term "a sale of electric energy at wholesale" as meaning "a sale of electric energy to any *person* for resale". (Italics ours.) Subsection (4) of Section 3 defines "person" as "an individual or a corporation", and subsection (3) of Section 3 defines "corporation" as not including "municipalities as hereinafter defined." Subsection (7) of Section 3 defines municipality as a "political subdivision or agency of a state competent under the laws thereof to carry on the business of developing, transmitting, utilizing, or distributing power."

Moreover, Section 201(f) contains the following:

> "No provision of this part shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State * * * unless such provision makes specific reference thereto."

The Borough of Groton is a municipal corporation and as such, of course, is a political subdivision of a state. It has authority to distribute power.

The words of the statute seem clear. Accordingly, we submit that the sales to Groton are not sales of the character which submits facilities used in connection therewith to the jurisdiction of the Commission.

The cases cited in the opinion of the Commission (R. 78) state that it must be contemplated that a municipality has the right to have the Commission supervise its contracts with companies selling to it at wholesale, in view of the provisions of Sections 306 and 313, which give munici-

palities the right to complain to the Commission, to apply for a rehearing, and to obtain a review in court. The reasoning is that the only sales over which the Commission has jurisdiction are sales at wholesale and consequently the only sale in which a municipality would be seriously interested would be a sale direct to the municipality. We submit that further consideration of the Act will demonstrate that this is not so.

Thus the provisions in Sections 306 and 313 give rights to "any person, State, municipality or State commission." Obviously, the rights of a state commission to be heard are not predicated upon or limited to sales to a state commission, because such sales could hardly have been contemplated. It seems manifest that official bodies, such as municipalities, municipal commissions, and state commissions, are given certain rights in respect of transactions to which they are not parties but in which they may feel they should represent some public interest. A municipality might desire to institute a complaint or participate in a controversy involving wholesale rates to a company serving its inhabitants.

It is also significant that Sections 306 and 313 apply to all parts of the Act. In this connection it is noteworthy that licenses to construct dams and the like may be issued to municipalities under Section 4(e), and that numerous other provisions of the Act are applicable to municipalities. Among these are 4(f), 7(a), 10(c), 10(e), 14, 19, 23(b), 301, 302, and 304. For Code references see U.S.C. Title 16, § 797(f); 800(a); 803(c); 803(e); 807; 812; 817; 825; 825(a); 825c.)

It is consequently evident that there is ample scope for applying the provisions of Sections 306 and 313 to a municipality without construing them as overriding the language of Sections 201(d) and (f).

The opinion of the Commission also states that as this

contention "is based solely upon the definitions of 'sale at wholesale', it obviously cannot apply to 'transmission in interstate commerce', even though such transmission is to a municipality." (R. 78)

But we submit that under no reasonable interpretation would the statute exclude the facilities of a company from the jurisdiction of the Commission because related to a sale to a municipality and at the same time nullify the exclusion by subjecting the seller to jurisdiction because of the transmission connected with such sales. Obviously the sales from the Borough to Fishers Island Company are beyond the jurisdiction of the Commission. It seems clear that Congress intended to deny the Commission jurisdiction over anything based upon purchases by a municipality or sales by a municipality. If the transaction with the municipality is beyond the jurisdiction of the Commission, there is no reason for it to have jurisdiction over facilities merely because they were connected with such a sale.

C.

THE COURT BELOW ERRED IN CONSIDERING THAT PETITIONER'S BUSINESS WAS "ESSENTIALLY INTERSTATE."

The decision of the Court seems to be based largely upon its conclusion that the system of Petitioner was "essentially interstate" and not "normally intrastate". We submit that in coming to this conclusion the Court committed fundamental errors.

The Court stresses the fact that Petitioner terminated its membership in the Connecticut Valley Power Exchange, an association for the interchange of electric energy between Connecticut and other States, before the effective date of the amendment to the Act, and that it severed certain connections after that time. The Court states that the

character of Petitioner's system can be judged from its activities and discontinuance of activities before the amendment to the Act went into effect.

The reasoning of the Court is subject to two criticisms.

In the first place, the evidence does not show what part of the business of Petitioner was involved in its participation in the Connecticut Valley Power Exchange. As a matter of fact, it was a comparatively unimportant part of the business of Petitioner. In our view of the case, this was immaterial. Certainly it was improper for the Court to assume, in the absence of evidence, that its participation in this Exchange rendered the business essentially an interstate business. As we have pointed out elsewhere, Petitioner had an extensive system by which it distributed energy to 107 towns, cities and boroughs in Connecticut, and undoubtedly most of the energy which it generated was used in the State. As far as we know, no study was ever made to determine how much, if any, energy from outside of the State could be regarded as coming to Petitioner's facilities prior to the effective date of the amendment.

There was no evidence that any of the facilities of Petitioner was constructed with a view to receiving energy from, or sending energy to, points outside of the State; and the fact is that none of the facilities was constructed with either of these aims in view.

The severance of connections after the effective date of the Act involved only a very small part of Petitioner's business. Only about 1/5 of 1% of all of the energy in which Petitioner dealt went to Fishers Island.

Only a very small percentage of all of the energy in which Petitioner dealt could have come from outside the State to its three areas connected with lines of the Connecticut Power Company. A small percentage of the total amount of all such energy came from the Connecticut

Power Company to these three areas.* There is no evidence at all as to what part of the energy coming to these places from the Connecticut Power Company came from outside the State, assuming that the conclusions of the Commission's engineers on this matter are sound and that some energy from Massachusetts did reach Petitioner's facilities. Their studies went no further than to show that out-of-State energy was received during a few hours in the period involved and most of those were hours when the loads of Petitioner were small. (R. 454-455; 543-557; Ex. 85, R. 1150-1151)

The second criticism of the reasoning of the Court is that it bases jurisdiction not upon what Petitioner is doing, but largely on what Petitioner did before the Act took effect. But as the Court said in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61, 72, the Commission's power extends only over facilities "which transmit energy actually moving in interstate commerce" and "the determinative fact is the ownership of facilities used in transmission."

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*The record does not show exactly what percentage came from the Connecticut Power Company, but from the figures in evidence it is possible to make calculations which give some idea of the situation. The total amounts of energy dealt in by Petitioner appear at R. 835. The total amounts received in the East Hampton district appear at R. 41, and a comparison of these figures shows that the amount purchased from Connecticut Power Company for this district was about ½ of 1% of all of Petitioner's energy. The total amount purchased for Bristol was approximately 7%. (R. 837) The Torrington Company purchased from Connecticut Power Company amounts shown at R. 400. These amounts, of course, included energy which the Torrington Company used itself in its own system. The total amounts which it purchased from the Connecticut Power Company came to about 4% of all of the total amounts used by Petitioner in its entire business. The figures given in this footnote relate to total purchases from the Connecticut Power Company, and a large part of this must have come from sources within the State.

Obviously, the Commission could not acquire jurisdiction over any of Petitioner's facilities unless they were facilities over which the energy actually moved in interstate commerce after the effective date of the Act. We submit that its status must be determined by conditions which actually existed at the times when jurisdiction is asserted, not by what had happened prior to that time—and certainly not by what happened prior to the effective date of the Act.

Respectfully submitted,

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JUNE, 1944.

APPENDIX.

STATUTES INVOLVED.

FEDERAL POWER ACT.

Act of August 21, 1935, C. 687, Title II (49 Stat. 838).

PART I—REGULATION OF THE DEVELOPMENT OF WATER POWER AND RESOURCES

SECTION 3.[1] The words defined in this section shall have the following meanings for purposes of this Act, to wit:

* * * * * * * * *

(3) "corporation" means any corporation, joint-stock company, partnership, association, business trust, organized group of persons, whether incorporated or not, or a receiver or receivers, trustee or trustees of any of the foregoing. It shall not include "municipalities" as hereinafter defined;

(4) "person" means an individual or a corporation;

* * * * * * * * *

(7) "municipality" means a city, county, irrigation district, drainage district, or other political subdivision or agency of a state competent under the laws thereof to carry on the business of developing, transmitting, utilizing, or distributing power.

* * * * * * * * *

PART II—REGULATION OF ELECTRIC UTILITY COMPANIES ENGAGED IN INTERSTATE COMMERCE

Declaration of Policy; Application of Part; Definitions.

SECTION 201. (a)[2] It is hereby declared that the business of transmitting and selling electric energy for ultimate distribution to the public is affected with a public interest,

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[1] 49 Stat. 838, U.S.C. Title 16, § 796.

[2] 49 Stat. 847, U.S.C. Title 16, § 824(a).

nd that Federal regulation of matters relating to genera-
on to the extent provided in this Part and the Part next
llowing and of that part of such business which consists
f the transmission of electric energy in interstate com-
erce and the sale of such energy at wholesale in interstate
ommerce is necessary in the public interest, such Federal
egulation, however, to extend only to those matters which
re not subject to regulation by the States.

(b)[3] The provisions of this Part shall apply to the trans-
ission of electric energy in interstate commerce and to
he sale of electric energy at wholesale in interstate com-
erce, but shall not apply to any other sale of electric en-
rgy or deprive a State or State commission of its lawful
uthority now exercised over the exportation of hydro-
ectric energy which is transmitted across a State line.
he Commission shall have jurisdiction over all facilities
or such transmission or sale of electric energy, but shall
ot have jurisdiction, except as specifically provided in this
art and the Part next following, over facilities used for
he generation of electric energy or over facilities used in
ocal distribution or only for the transmission of electric
nergy in intrastate commerce, or over facilities for the
ransmission of electric energy consumed wholly by the
ransmitter.

(c)[4] For the purpose of this Part, electric energy shall
e held to be transmitted in interstate commerce if trans-
itted from a State and consumed at any point outside
hereof; but only insofar as such transmission takes place
ithin the United States.

(d)[5] The term "sale of electric energy at wholesale"

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[3] 49 Stat. 847, U.S.C. Title 16, § 824(b).

[4] 49 Stat. 848, U.S.C. Title 16, § 824(c).

[5] 49 Stat. 848, U.S.C. Title 16, § 824(d).

when used in this Part means a sale of electric energy to any person for resale.

(e)[6] The term "public utility" when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part.

(f)[7] No provision in this Part shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State, or any agency, authority, or instrumentality of any one or more of the foregoing, or any corporation which is wholly owned, directly or indirectly, by any one or more of the foregoing, or any officer, agent, or employee of any of the foregoing acting as such in the course of his official duty, unless such provision makes specific reference thereto.

* * * * * * * * * *

PART III—LICENSEES AND PUBLIC UTILITIES; PROCEDURAL AND ADMINISTRATIVE PROVISIONS.

Accounts, Records, and Memoranda.

SECTION 301. (a)[8] Every licensee and public utility shall make, keep, and preserve for such periods, such accounts, records of cost-accounting procedures, correspondence, memoranda, papers, books, and other records as the Commission may by rules and regulations prescribe as necessary or appropriate for purposes of the administration of this Act, including accounts, records, and memoranda of the generation, transmission, distribution, delivery, or sale of electric energy, the furnishing of services or facilities in connection therewith, and receipts and expenditures with

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[6] 49 Stat. 848, U.S.C. Title 16, § 824(e).

[7] 49 Stat. 848, U.S.C. Title 16, § 824(f).

[8] 49 Stat. 854, U.S.C. Title 16, § 825(a).

respect to any of the foregoing: *Provided, however,* That nothing in this Act shall relieve any public utility from keeping any accounts, memoranda, or records which such public utility may be required to keep by or under authority of the laws of any State. The Commission may prescribe a system of accounts to be kept by licensees and public utilities and may classify such licensees and public utilities and prescribe a system of accounts for each class. The Commission, after notice and opportunity for hearing, may determine by order the accounts in which particular outlays and receipts shall be entered, charged, or credited. The burden of proof to justify every accounting entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry, and the Commission may suspend a charge or credit pending submission of satisfactory proof in support thereof.

* * * * * * * * *

Rehearings; Court Review of Orders.

SECTION 313. (a)[9] Any person, State, municipality, or State commission aggrieved by an order issued by the Commission in a proceeding under this Act to which such person, State, municipality, or State commission is a party may apply for a rehearing within thirty days after the issuance of such order. The application for rehearing shall set forth specifically the ground or grounds upon which such application is based. Upon such application the Commission shall have power to grant or deny rehearing or to abrogate or modify its order without further hearing. Unless the Commission acts upon the application for rehearing within thirty days after it is filed, such application may be deemed to have been denied. No proceeding to review any order of the Commission shall be brought by any per-

[9] 49 Stat. 860, U.S.C. Title 16, § 825*l*(a).

son unless such person shall have made application to the Commission for a rehearing thereon.

(b)[10] Any party to a proceeding under this Act aggrieved by an order issued by the Commission in such proceeding may obtain a review of such order in the Circuit Court of Appeals of the United States for any circuit wherein the licensee or public utility to which the order relates is located or has its principal place of business, or in the United States Court of Appeals for the District of Columbia, by filing in such court, within sixty days after the order of the Commission upon the application for rehearing, a written petition praying that the order of the Commission be modified or set aside in whole or in part. A copy of such petition shall forthwith be served upon any member of the Commission and thereupon the Commission shall certify and file with the court a transcript of the record upon which the order complained of was entered. Upon the filing of such transcript such court shall have exclusive jurisdiction to affirm, modify, or set aside such order in whole or in part. No objection to the order of the Commission shall be considered by the court unless such objection shall have been urged before the Commission in the application for rehearing unless there is reasonable ground for failure so to do. The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive.

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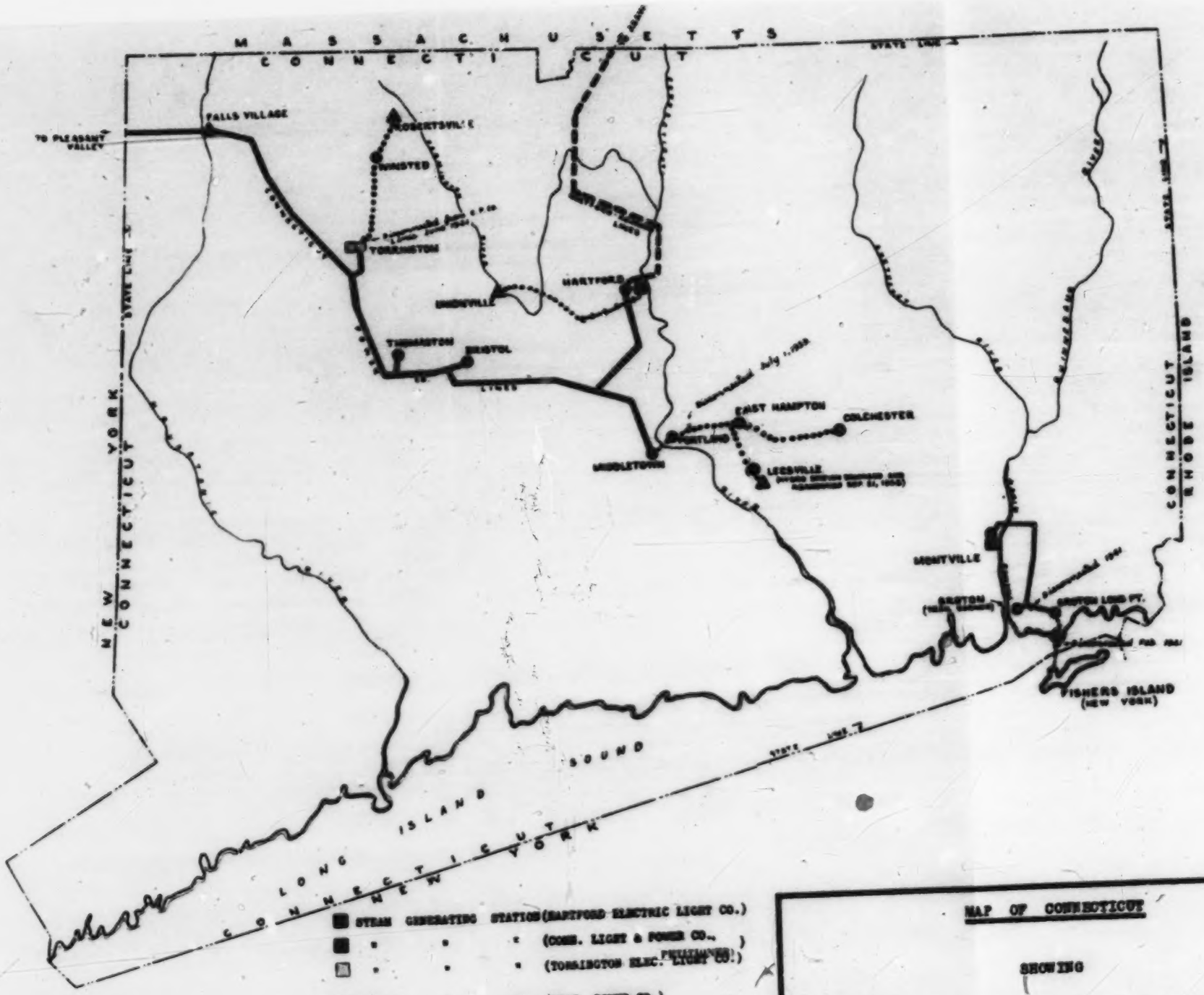
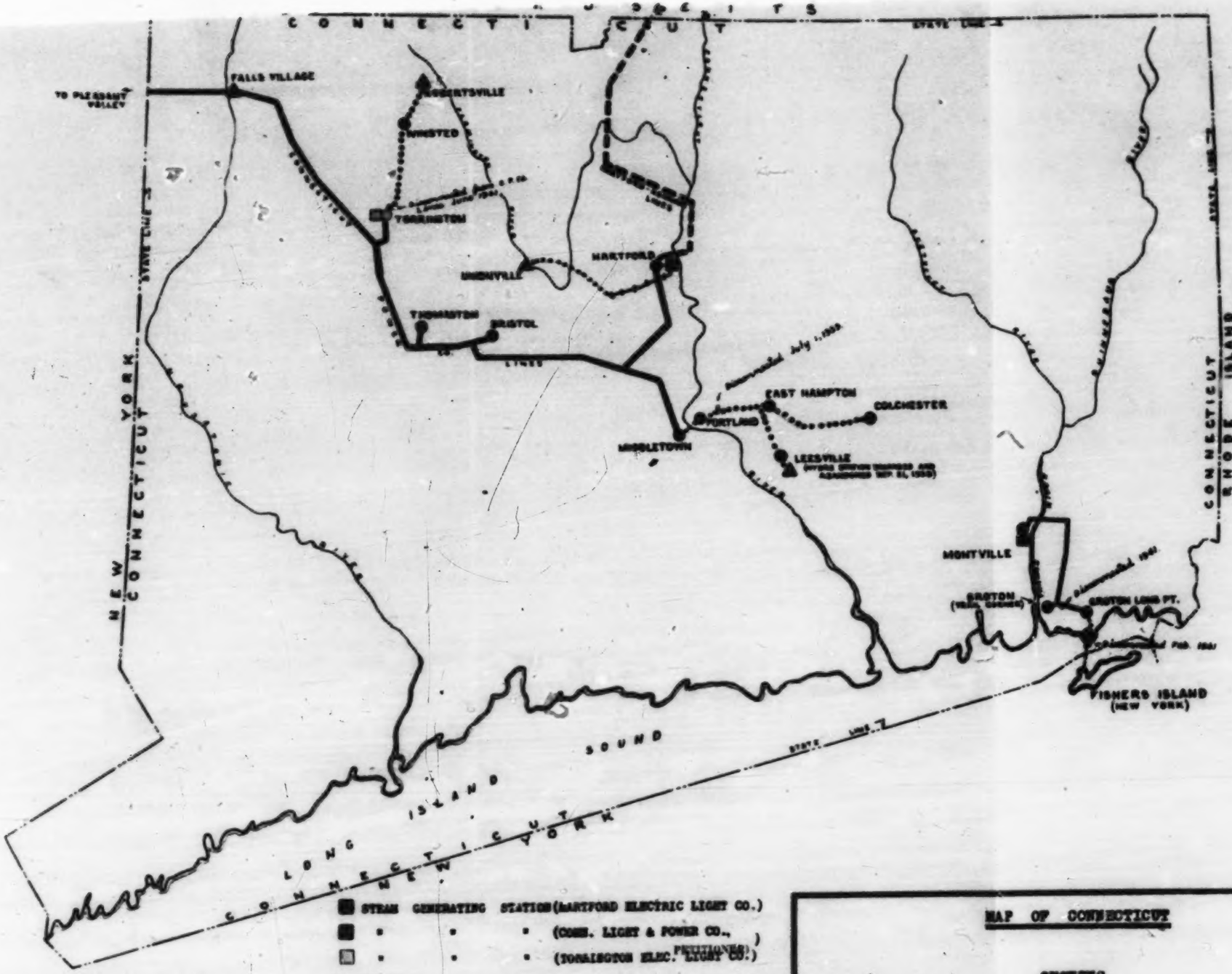
[10] 49 Stat. 860, U.S.C. Title 16, § 825*l*(b).



MAP OF CONNECTICUT

SHOWING

CONNECTIONS OF THE CONNECTICUT LIGHT AND POWER COMPANY WITH OTHER SYSTEMS INVOVED IN FINDINGS OF THE FEDERAL POWER COMMISSION, AS THE CONNECTIONS EXISTED FROM JANUARY



STEAM GENERATING STATION (HARTFORD ELECTRIC LIGHT CO.)
" " " (CONN. LIGHT & POWER CO., PETITIONER)
" " " (TORRINGTON ELEC. LIGHT CO.)
HYDRO " " (CONN. POWER CO.)
" " " (CONN. LIGHT & POWER CO., PETITIONER)

SUBSTATION (CONN. POWER CO.)
" (CONN. LIGHT & POWER CO.)
" (TORRINGTON ELEC. LIGHT CO.)
" (BORO. OF GROTON)
" (CONN. LIGHT & POWER CO.
" (BORO. OF GROTON

HARTFORD-AGAWAM 66000 VOLT LINE (CONN. POWER CO.)
OTHER 66000 VOLT LINES (CONN. POWER CO.)
33000 VOLT LINE (CONN. LIGHT & POWER CO.)
LESS THAN 33000 VOLT (CONN. POWER CO.)
" " 33000 VOLT (CONN. LIGHT & POWER CO.)
" " 33000 VOLT (HARTFORD ELECTRIC LIGHT CO.)
" " 33000 VOLT SUBMARINE CABLE (FISHERS ISLAND CO.)
" " 33000 VOLT (BORO. OF GROTON)

MAP OF CONNECTICUT

SHOWING

CONNECTIONS OF THE CONNECTICUT LIGHT AND POWER COMPANY WITH OTHER SYSTEMS INVOVED IN FINDINGS OF THE FEDERAL POWER COMMISSION, AS THE CONNECTIONS EXISTED FROM JANUARY 1, 1937 UNTIL DATES INDICATED THEREON.

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In the

Supreme Court of the United States.

OCTOBER TERM, 1944.

No. 189.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

BRIEF FOR PETITIONER.

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November, 1944.

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In the

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OCTOBER TERM, 1944.

No. 189

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

BRIEF FOR PETITIONER.

OPINIONS.

The opinion of the Federal Power Commission, F.P.C. Opinion No. 75, May 15, 1942, is reported in 44 P.U.R. (NS) 170. (R. 63) The opinion of the Court of Appeals for the District of Columbia (R. 1170) is reported in 141 F. 2d 14.

JURISDICTION.

The judgment of the Court of Appeals for the District of Columbia was entered on February 28, 1944. Petition for rehearing was filed by Petitioner on March 13, 1944 (R. 1179), and was denied on March 25, 1944. (R. 1195)

The jurisdiction of this Court is invoked under Section 313(b) of the Federal Power Act,* 49 Stat. 860, 16 U.S.C.,

* Hereinafter referred to as "the Act".

Section 825l(b), and Section 240 of the Judicial Code as amended, U.S.C., Title 28, Section 347.

Petition for certiorari was granted by this Court on October 9, 1944.

QUESTIONS PRESENTED.

1. Is a local electric distributing company, which does business entirely within one state, and which does not manufacture, transmit, or sell any electric energy consumed outside of that state, a "public utility" within the meaning of the Act, so as to be subject to the general jurisdiction of the Commission thereunder, because it receives, at a substation owned and operated by it in the center of an isolated district of its electric system, some electric energy originating in another state, which is used solely for the supply of local retail consumers in such district?

2. In reviewing the Commission's determination that electric energy originating in such other state was received into the company's electric system, must not the Court of Appeals, on petition for review, weigh the evidence and arrive at an independent determination as to such jurisdictional facts?

3. Was such electric distributing company a "public utility", so as to be subject to the general jurisdiction of the Commission, during periods preceding the hearing and determination of the Commission, because in addition to the facts stated in question "1" the company (as found by the Commission) received some electric energy originating in another state at points within the state and conducted the same over its lines for a few miles wholly within the State, and used the same solely for the supply of local consumers in two other small isolated districts of its electric system?

4. Was such electric distributing company a "public utility" so as to be subject to the general jurisdiction of the Commission, during a period preceding the hearing and

determination of the Commission, because the company transmitted and sold electric energy to a municipal corporation of the State in which the Company operates, and the municipality resold a portion of such energy, (comprising only 1/5 of 1% of the total amount of energy generated or received by the company) to a corporation which transmitted the same to a small island which is part of another state, located over seventy-five miles from the mainland of such other state, for local retail consumption on that island?

5. If such an electric distributing company was a "public utility" within the meaning of the Act during periods of time preceding the hearing and determination of the Commission, but ceased to occupy such status prior to the hearing and determination, is it proper for the Commission to direct the company to comply with its various accounting orders for any of such periods?

STATUTE INVOLVED.

The statute involved is the Federal Power Act, and the principal sections of importance here are Sections 3, 201, 301 (a), and 313 (a) and (b), printed in the appendix, pp. 63–67, *infra*.

STATEMENT.

A. THE PROCEEDINGS BELOW.

Under the provisions of the Federal Power Act, individuals or corporations occupying the status of a "public utility", as defined by the Act, are subject to broad regulatory powers of the Federal Power Commission over the lease and sale of facilities, mergers, consolidations, the acquisition of securities of other "public utilities" (Sec. 203 (a)); the issuance and guarantee of securities (Sec. 204); rates and charges (Sec. 205); the ascertainment of cost and depreciation of properties (Sec. 208 (a)); accounts and accounting (Sec. 301); rates of depreciation (Sec. 302 (a)); the filing of annual reports (Sec. 304 (a)); and other matters.

Whether individuals or corporations occupy the status of a "public utility" under the Act, depends upon whether they own or operate "facilities subject to the jurisdiction of the Commission" under Part II of the Act, whose provisions apply to "the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce." Under Section 201, the Commission is given jurisdiction "over all facilities for such transmission or sale of electric energy," but it is provided that, except as specifically provided in Parts II and III of the Act, the Commission "shall not have jurisdiction . . . over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce." This section became effective in 1935.

This case involves the construction of the phrases in Section 201 quoted above and the application of these phrases to the facilities of Petitioner in four districts in which the Commission held Petitioner owned facilities subject to its jurisdiction. (R. 64-69) Three of these districts, the Bristol, East Hampton, and Torrington-Winsted districts, were districts in Connecticut for which Petitioner purchased electric energy from other companies for local distribution. The fourth district was the Groton district, in Connecticut, in which Petitioner sold electric energy to the Borough of Groton, which in turn sold part of the energy to another company which transmitted it from Connecticut to Fishers Island, New York. Except at Bristol, all the facilities of Petitioner in these districts had, prior to the hearing before the Commission, been severed from any lines which were connected in any way with any lines running outside of the State. (R. 74)

The Commission, after hearings on its order to show cause directed to Petitioner and on the answer of Petitioner

thereto,* entered an order on May 15, 1942, which by reference incorporated specific findings of fact and also a discussion entitled "opinion". (R. 83) The Commission determined that Petitioner "was a public utility", during various specified periods since August 25, 1935, but ending prior to the hearing and decision, by reason of Petitioner's facilities and operations in its East Hampton, Torrington-Winsted, and Groton districts. The Commission further determined that Petitioner "continued to be" a public utility subject to its jurisdiction by reason of Petitioner's facilities in its Bristol district. (R. 63–82) The order requires Petitioner to comply currently with accounting requirements applicable to such public utilities.

On June 13, 1942, Petitioner filed a petition for rehearing and stay of order. (R. 1155) This was denied by the Commission on June 23, 1942. (R. 84) The Commission in the order denying the petition did, however, extend the time within which Petitioner should commence the studies and work necessary to comply with the order.

On August 18, 1942, Petitioner filed in the Court of Appeals a petition for review pursuant to Section 313(b) of the Federal Power Act. (R. 1) After hearing, the Court below** affirmed the order of the Commission (R. 1178) and later denied a petition for rehearing. (R. 1195)

B. GENERAL CHARACTER OF PETITIONER'S BUSINESS.

Petitioner is a local electric distributing company, distributing electric energy generated and purchased by it within the State of Connecticut and, except for facilities in the above mentioned four districts, there is no finding that

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* The answer denied that Petitioner had been a public utility subject to the jurisdiction of the Commission, and admitted that its accounts had not been kept in accordance with accounting orders of the Commission applicable to public utilities subject to the jurisdiction of the Commission.

** The Court consisted of Mr. Justice Miller, Mr. Justice Arnold (who wrote the opinion) and Judge Dobie.

Petitioner ever owned any facilities subject to the jurisdiction of the Commission.

The territory served directly by Petitioner covers a substantial part of the State of Connecticut. It serves electric energy in 107 towns, cities, and boroughs, which have a total population of about 660,000, not including about 130,000 served by other Connecticut utilities purchasing substantially all of their electric requirements from Petitioner. (R. 86-87)

It was established by uncontradicted evidence that since Aug. 26, 1935,* Petitioner has owned or operated no property outside of Connecticut. It has owned no line which crosses the Connecticut boundary. It has owned no line connecting at the Connecticut state line with the line of any other utility. It has had no contract with any party outside of the State of Connecticut for the purchase or sale of electric energy. It has had no contract to deliver electric energy outside of Connecticut, or to receive electric energy outside or from outside of Connecticut. It has not bought or sold any electric energy outside of Connecticut. It has had no contract or arrangement calling for delivery of electric energy to any other company or utility at the state line or for the receipt of energy from any other company or utility at the state line. (R. 119-125)

C. PETITIONER'S SUPPLY FOR ITS BRISTOL, EAST HAMPTON AND TORRINGTON-WINSTED DISTRICTS.

The theory of the Commission that in the Bristol, East Hampton and Torrington-Winsted districts Petitioner owned or operated facilities subject to the jurisdiction of the Commission was predicated upon the establishment of three conclusions: (1) that energy of Massachusetts origin at times supplied part or all of the loads of Pe-

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* The date upon which the amendment to the Federal Power Act became effective.

titioner, (2) that in these districts, some of Petitioner's facilities were facilities for transmission of electric energy in interstate commerce, and (3) that some of such facilities were not used in local distribution.

There was no finding as to the amount of electric energy transmitted from Massachusetts which came to these facilities of Petitioner or what part of the total amount of electric energy coming to these facilities came from Massachusetts. The testimony supporting the findings of the Commission was limited to a comparatively few hours of each year. (R. 454–455, 543–557, 947–949, Ex. 85, R. 1150–1151)

The facilities of Petitioner which the Commission held subject to its jurisdiction are indicated in red on the map which is appended hereto after p. 79. The Bristol, East Hampton, and Torrington-Winsted districts were not, during the respective periods when the Commission found the facilities subject to its jurisdiction, connected with the main system of Petitioner (see R. 137, 391–395) which is not shown on the map.

The facilities owned and operated by Petitioner which are used to receive electric energy for the supply of its Bristol District, consist of a substation and appurtenances contained therein, which are connected with the Connecticut Power Company's high tension line in Bristol, Connecticut, which are used to receive electric energy from the high tension line; to lower the voltage thereof; and to eliminate fluctuation in the voltage, for local retail distribution of the energy to the Company's consumers in the Bristol District. (R. 68–69, 838–846)

The facilities owned and operated by Petitioner in the Torrington-Winsted district which the Commission found were subject to its jurisdiction were a substation at Torrington with facilities for raising voltage from 2,300 to 27,600 volts, a substation at Winsted with facilities for lowering voltage from 27,600 to 4,600 volts, and a 27,600 volt double circuit wood pole line about 10 miles in length,

between those two substations. (R. 68. See also map at end of this brief.) These were all disconnected from the lines of Connecticut Power Company before the hearing before the Commission. (R. 73–74)

The facilities of Petitioner which the Commission found were subject to its jurisdiction in the East Hampton district consisted of substation facilities for reducing voltage from 13,800 volts to 4,600 volts at Petitioner's Leesville substation, and to 2,300 volts at its East Hampton, Colchester, Comstock Bridge, Collins Hill, and Westchester substations, and the 13,800 volt lines connecting them to the facilities of The Connecticut Power Company at Pole 110 in Portland. (R. 66–67) These facilities were disconnected from the lines of the Connecticut Power Company in June, 1939—long before this proceeding was instituted by the Commission. (R. 66, 74)

These three districts were supplied by energy from the so-called C.P. lines, with which all three of these districts were connected. The term "C.P. lines" is an abbreviation for "Connecticut Power lines," the lines being owned by the Connecticut Power Company.* These lines consist of two circuits which transmit energy at 66,000 volts. They are located wholly in the State of Connecticut and run from a bus at a substation of the Connecticut Power Company, in Hartford, in a westerly direction to a generating plant owned by the Connecticut Power Company at Falls Village, Connecticut, near the New York line. (Ex. 38; R. 684–686; see also Exs. 70 and 73)

That substation of the Connecticut Power Company is

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* The Connecticut Power Company is a corporation entirely separate from Petitioner. The Connecticut Power Company and the Hartford Electric Light Company, which is referred to hereafter, were not affiliated in any way with Petitioner. Petitioner owned no stock in either of these companies, and neither of them owned any stock in the Petitioner. No person who was at any time an officer or director of Petitioner served simultaneously in a similar capacity either the Connecticut Power Company or the Hartford Electric Light Company. (R. 975–976)

djacent to the large steam generating plant of the Hartord Electric Light Company and other steam plants of hat company. All of these plants are connected electricly with the C.P. lines. (R. 390–391, 969–970)

For the Winsted district Petitioner purchased energy rom the Torrington Electric Light Company, which obained its supply either from its own plant or from the Connecticut Power Company. For the East Hampton and Bristol districts Petitioner purchased energy directly from Connecticut Power Company. (Ex. 8, R. 1039, Ex. 25, 1055; Ex. 11, R. 1044) These contracts contained no express provisions as to the source of the energy, but there was a provision that the unit charge for energy supplied should be adjusted on the basis of the cost of coal in the bunkers of the South Meadow plant of the Hartford Company in Hartford.

The Connecticut Power Company at all times had an understanding with the Hartford Electric Light Company under which the Hartford was obligated to supply such capacity as might be required, in addition to the capacity of the Connecticut Power Company's own water power plants,* to carry the loads on the C.P. lines, including those at Bristol, at Middletown (which included the East Hampton area of Petitioner), and at Torrington (which included the Winsted district of Petitioner). This understanding was eventually embodied in formal contracts, the one relating to Middletown and Torrington being dated June 1, 1936, and the one relating to Bristol being dated June 8, 1937. (Exs. 30, R. 1063; 36, R. 1072; 37, R. 1081; R. 941-944, 961, 964-966)

The Commission based its conclusion as to the presence of out-of-state energy on Petitioner's facilities connected

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* These plants of the Connecticut Power Company are all located in Connecticut.

with the C.P. lines upon the fact that a 66,000-volt double-circuit line running from Agawam, Massachusetts, across the Connecticut-Massachusetts boundary was connected to the bus in the substation of the Connecticut Power Company, at Hartford, mentioned above. Through this line the Connecticut Power Company at times obtained electric energy which was generated outside of Connecticut through the operation of the so-called Connecticut Valley Power Exchange. (R. 66) Petitioner is not a member of this Exchange. (R. 275-276)

The companies which contracted to supply those loads of Petitioner which were connected with the C.P. lines (i.e., those in the three districts under discussion) have at all times been able to obtain the necessary supply from generating plants located in Connecticut, and at no time were the combined loads of Petitioner in these three districts greater than the amount of electric energy generated contemporaneously by plants in Connecticut which were connected with the C.P. lines. (R. 949-953) If any Massachusetts energy reached Petitioner's facilities in these three districts, it had been transformed and divided for local distribution before reaching Petitioner's facilities. (R. 689-690, 699-700)

D. SALES TO THE BOROUGH OF GROTON AND RESALES TO THE FISHERS ISLAND COMPANY.*

The Commission also found that until February 28, 1941, Petitioner owned facilities at or near Groton and Montville and between those places which were subject to the jurisdiction of the Commission. (R. 64, 65) Its finding was based on the fact that Petitioner sold electric energy to the Borough of Groton, most of which the Borough of Groton

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*"Fishers Island Company" is employed throughout this brief to denote the corporation engaged at the corresponding period of time in purchasing electric energy from the Borough of Groton for supply to Fishers Island.

used for local distribution in Connecticut, but part of which it sold and delivered to another company which transmitted the energy from Connecticut to Fishers Island, New York, for local distribution there. (R. 64, 533) The amount of such energy which went to Fishers Island was only about 1/5 of 1% of the total amount of energy generated and received by Petitioner, and no energy generated or transmitted by Petitioner has gone to Fishers Island since February, 1941. (R. 835-836, 196-197) All of the energy which went to Fishers Island had been transformed before leaving Connecticut. (R. 199-203)

E. THE DECISION OF THE COURT BELOW.

The Court of Appeals held, without discussion of the legal principles involved, that in each of the four districts Petitioner had facilities "for transmission of electric energy in interstate commerce". (R. 1170-1178)

The Court did not discuss the question whether the facilities by which Petitioner distributed energy in the Bristol, East Hampton and Torrington-Winsted districts were "used in local distribution", saying that it was not relevant to the case. This conclusion was based upon its construction of the Act to the effect that the last sentence of Section 201 (b) of the Act does not exempt from the jurisdiction of the Commission a company which owns only facilities used in local distribution. The Commission itself in its opinion in this case did not adopt or suggest this construction, and as far as we are aware its attorneys had not urged this construction of the Act until recently.

The Court of Appeals held, without discussion of its duty to weigh the evidence, that as to the questions of fact the sole question was whether the findings of the Commission were "sustained by substantial evidence", and it concluded that there was substantial evidence that energy generated in Massachusetts reached facilities of Petitioner

in Connecticut at its East Hampton, Torrington-Winsted and Bristol districts.

The Court also held that the facilities of Petitioner at or near Groton had been subject to the jurisdiction of the Commission, but recognized the fact that after February, 1941, this was no longer the situation. In discussing the Groton situation, it made no mention of the contention of Petitioner that, under proper construction of the statute, sales to a municipal corporation could not be the basis of jurisdiction of the Commission.

The Court paid no particular attention to the fact that the status of Petitioner may have changed after the effective date of the Act but before the hearings and determination of the Commission. Its decision seems to rest in large part upon the fact that Petitioner discontinued its arrangements and connections with the Connecticut Valley Power Exchange prior to the effective date of the Act.

SPECIFICATION OF ERRORS.

The Court of Appeals for the District of Columbia erred:

1. In holding that Petitioner *is* a "public utility" subject to the jurisdiction of the Commission under the Act, *i.e.*, as of the date of the Commission's determination, and in affirming the order of the Commission requiring current compliance with its accounting orders and system of accounts at the time of the making of its determination and for the future; and specifically in holding that any facilities of Petitioner in its Bristol district are facilities for "transmission of electric energy in interstate commerce" within the meaning of §201 of the Act, and in refusing to hold that all facilities in the Bristol district are exempt from the jurisdiction of the Commission as "facilities used in local distribution".

2. In affirming the order of the Commission insofar as such order was based upon the Commission's determina-

tion that Petitioner *was* such a "public utility" subject to its jurisdiction under the Act during past periods, by reason of Petitioner's ownership and operation of facilities for the receipt and distribution of electric energy in its Bristol, East Hampton or Torrington-Winsted districts. And specifically in holding that any facilities of Petitioner in these districts were facilities for "transmission of electric energy in interstate commerce" within the meaning of §201 of the Act, and in refusing to hold that all facilities in these districts were exempt from the jurisdiction of the Commission as "facilities used in local distribution".

3. In holding that a company is such a "public utility", subject to the general jurisdiction of the Commission under the Act, even though its only facilities over which flows electric energy generated in another State are facilities "used in local distribution".

4. In affirming the order of the Commission insofar as such order was based on the Commission's determination that Petitioner was a "public utility" under the Act, during a past period, by reason of Petitioner's ownership and operation of facilities for the sale and delivery of electric energy to the Borough of Groton. And specifically in holding that any such facilities were facilities for "transmission of electric energy in interstate commerce" or for "the sale of electric energy at wholesale in interstate commerce" within the meaning of § 201 of the Act; in refusing to hold that all such facilities were exempt from the jurisdiction of the Commission because used in sales to a municipal corporation; and in refusing to hold that the amount of energy which was transmitted to Fishers Island was so negligible that it must be disregarded.

5. In determining Petitioner's status under the provisions of the Act, by reference to Petitioner's acts in separating itself from the Connecticut Valley Power Exchange prior to the effective date of the 1935 amendments to the

Act, and further in determining Petitioner's status under the Act by the application of standards which are not contained in the Act or in any other applicable statute.

6. In holding that the Court was under no duty to weigh the evidence in regard to jurisdictional facts and to make its own determination thereon. This was based upon improper construction of the statute, or, if its construction of the statute was correct, the statute is unconstitutional—

(a) In that it deprives Petitioner of property without due process of law in violation of the provisions of Article V of the Amendments to the Constitution of the United States;

(b) In that it curtails the powers of the Judiciary in violation of the provisions of Article III of Section 2 of the Constitution; and

(c) In that it confers on the United States a power reserved to the State of Connecticut.

SUMMARY OF ARGUMENT.

I.

PETITIONER IS NOT A "PUBLIC UTILITY" UNDER THE PROVISIONS OF THE FEDERAL POWER ACT AND THEREFORE IS NOT CURRENTLY SUBJECT TO ACCOUNTING REGULATION BY THE FEDERAL POWER COMMISSION.

This point relates to Petitioner's status at the time of the hearing and determination of the Commission and deals solely with the facilities at Bristol.

A. The Act was not intended to regulate a local distributing company like the Petitioner.

The primary purpose of the Act was to regulate interstate sales of electric energy and not to regulate a local distributing company. This appears in Section 201 (a) of the Act, which provides that Federal regulation is to "extend only to those matters which are not subject to regulation by the States" and from the opinion of this Court in *Jersey*

Central Power & Light Co. v. *Federal Power Commission*, 319 U.S. 61, 67–68.

No purpose would be served by Federal regulation of Petitioner at Bristol, where it engaged in local distribution. Before Petitioner receives the energy and distributes same to its customers in Bristol, the Federal Power Commission *presumably has already exercised its function* of regulating the company or companies which produced the energy in Massachusetts and transmitted the same to and across the state line into Connecticut. This is not a situation where "cost would be fixed prior to the incidence of federal regulation" as the situation in the *Jersey Central* case. When Petitioner receives the energy at Bristol, the "incidence of Federal regulation" has not only been reached but passed. If, however, Petitioner is a "public utility" within the meaning of the Act, the Commission would possess many regulatory powers over the Petitioner, none of which is necessary to carry out the purposes of the Act.

The legislative history of the Act shows that it was not intended to regulate local distributing companies. The situation presented is one wherein Congress did not attempt to preempt the whole field to the fullest extent of its constitutional power, and "the narrow question" presented is "what Congress did, not what it could do", as in *Federal Trade Commission* v. *Bunte Bros., Inc.*, 312 U.S. 349, 355.

B. The Act gives general jurisdiction to the Commission over a company only if it owns facilities for "the transmission of electric energy in interstate commerce" or "the sale of electric energy at wholesale in interstate commerce", and Petitioner owns no such facilities at Bristol.

As no question of any such sale is involved, the question is whether Petitioner owns any facilities for transmission in interstate commerce. Under the traditional concepts of interstate commerce, this Court had held prior to the enactment of the Act that sale and delivery to local consumers at

retail did not constitute "any part of interstate commerce" even though the commodity sold had been brought from another state and was drawn for distribution directly from interstate mains. As the Court said in *Missouri* v. *Kansas Gas Co.*, 265 U.S. 298, 308, "with the delivery . . . to the distributing companies . . . the interstate movement ends". The situation here presented is similar to numerous cases in which this Court has held that interstate commerce ended before the activities of a local distributing company began.

As the companies which contracted to supply the load of Petitioner at Bristol have at all times been able to obtain the necessary supply from generating plants located in Connecticut, it is clear that the State Commission had jurisdiction over its contracts and all of its facilities; and, as appears from the language of the Act itself and its legislative history, Congress intended to preserve jurisdiction of the state over them and not to bestow such jurisdiction on the Federal Power Commission.

The provisions of Section 201 (c) of the Act should not be construed to stamp as facilities subject to the jurisdiction of the Commission all facilities for conveyance of electric energy from the point of generation in one state to the point of consumption in another state.

C. "Facilities used in local distribution" are exempt from the jurisdiction of the Commission, and all the facilities of Petitioner at Bristol are "facilities used in local distribution".

Facilities used in local distribution are exempt from the jurisdiction of the Commission. The Court below erred in concluding the contrary, and in doing so lost sight of the structure of the Act and its legislative history. These indicate clearly that the provision of the Act, "but [the Commission] shall not have jurisdiction . . . over facilities used in local distribution", was intended to create an exemption of

such facilities even if they are facilities "for transmission of electric energy in interstate commerce".

The exemption should be construed to exempt all the facilities of a local distributing company beyond the point of delivery of the electric energy to it. In construing the phrase, "facilities used in local distribution", the question is not whether such facilities are to be characterized as "transmission" or "distribution" facilities. These are terms upon which experts may differ in their application to particular circumstances. The question is merely whether the facilities are actually "used in local distribution". This view is established both by the language of the Act and its legislative history. It is notable that regulations for accounting of the Federal Power Commission, and also the Uniform System of Accounts for Electric Utilities of the National Association of Railroad and Utilities Commissioners, and of the Public Utilities Commission of the State of Connecticut classify as "distribution stations" stations which change the energy from transmission to distribution voltage.

The facilities of Petitioner at Bristol which the Commission found subject to its jurisdiction were all in such a distribution station—beyond the point of the delivery of electric energy to Petitioner.

D. The Court below erred in concluding that Petitioner's business was essentially interstate by reason of Petitioner's operations prior to the effective date of the Act.

The Court stressed the fact that Petitioner terminated its membership in the Connecticut Valley Power Exchange, an association for the interchange of electric energy between Connecticut and other states, before the effective date of the Act, and stated that the character of its system can be judged from its activities before that time.

The reasoning of the Court below is subject to several criticisms. As this Court said in the *Jersey Central* case, the Commission's power extends only over facilities "which transmit energy actually moving in interstate commerce" and "the determinative fact is the ownership of facilities used in transmission." Obviously the Commission can not acquire jurisdiction over any of Petitioner's facilities *unless they were facilities over which energy actually moved* in interstate commerce at the time as of which jurisdiction is asserted.

Moreover the evidence does not show what part of the business of Petitioner was involved in its participation in the Exchange. As a matter of fact, it was a comparatively unimportant part of the business of Petitioner. It was improper for the Court below to assume, in the absence of evidence, that its participation in this Exchange rendered the business essentially an interstate business.

II.

THE COURT BELOW ERRED IN REFUSING TO WEIGH THE TESTIMONY AS TO JURISDICTIONAL FACTS.

An essential basis for jurisdiction of the Commission is establishment of the fact that at Bristol and two other areas Petitioner purchased energy which included electric energy in substantial amounts transmitted from Massachusetts. The Court below disregarded our contention that it was under the duty of weighing the evidence and making its own determination of this jurisdictional fact, and considered that the question was merely whether there was substantial evidence to support this finding of the Commission.

The statute providing for a review (Section 313, (b)) should not be construed in such a way as to raise grave doubt as to its constitutionality. If it were construed to relieve the reviewing court of the duty of making its own independent determination of the jurisdictional fact, it would be

unconstitutional. *Crowell* v. *Benson*, 285 U.S. 22; *St. Joseph Stockyards Co.* v. *United States*, 298 U.S. 38, 51, and other cases.

III.

PETITIONER WAS NOT A "PUBLIC UTILITY" UNDER THE PROVISIONS OF THE FEDERAL POWER ACT" AT ANY TIME SINCE THE EFFECTIVE DATE OF THE 1935 AMENDMENTS TO THE ACT.

This point relates to connections for the supply of the East Hampton and Torrington-Winsted districts and the connection between the Borough of Groton and Fishers Island, New York, all of which were discontinued prior to the hearing and determination of the Commission.

The situation in the first two of these districts differed from that in the Bristol district only in respect of the nature of the facilities, which included some short electric lines for conveyance of electric energy received within the State of Connecticut for local distribution, but (as found by the Commission) some of which originated in Massachusetts.

The same principles apply to these districts as to the Bristol district. In these districts, as in the Bristol district, the receipt of the electric energy from Petitioner's vendors terminated the interstate journey of the energy. Moreover, all of the facilities in these two districts came within the exemption of "facilities used in local distribution."

Facilities owned and operated by Petitioner for the transmission and sale of electric energy to the Borough of Groton were not subject to the jurisdiction of the Commission for two reasons.

First, the Borough of Groton is a municipal corporation having authority to distribute power; and, under the definitions contained in the Act, sales to such a corporation are exempt from the jurisdiction of the Commission and such

a corporation is entirely exempt from the provisions of Part II of the Act.

In such circumstances no "incidence of federal regulation" occurred and it cannot be said that without general jurisdiction of the Commission over Petitioner, "federal rate control would be substantially impaired, if not rendered futile," as in the *Jersey Central* case. The Act should *not be construed as subjecting to the jurisdiction of the Commission* facilities used in transmission in connection with such a sale.

Secondly, the sale of energy by the Borough of Groton to Fishers Island should be disregarded under the doctrine of *de minimis non curat lex*. The amount of electric energy which was transmitted to Fishers Island was only about one-fifth of one per cent. of all the energy generated and received by Petitioner. But if the sales to Groton or the transmission facilities used for them are held subject to the jurisdiction of the Commission, the result is not merely to submit these particular sales and facilities to the jurisdiction of the Commission, but to submit a very large part of the activities of Petitioner's entire business in over one hundred towns and cities and boroughs to the jurisdiction of the Commission.

IV.

PETITIONER IS NOT NOW A PUBLIC UTILITY WITHIN THE MEANING OF THE FEDERAL POWER ACT, AND NO USEFUL PURPOSE WOULD BE SERVED IN REQUIRING IT TO COMPLY WITH ORDERS APPLICABLE TO PUBLIC UTILITIES EVEN IF IT HAS BEEN SUCH A PUBLIC UTILITY AT ANY TIME.

If it should be held that Petitioner has engaged in some activities or has had some facilities which rendered it a public utility, it does not follow that it is still subject to the jurisdiction of the Commission. Unless it should be held that some of Petitioner's facilities at Bristol render it subject to the jurisdiction of the Commission, there is no

ground for any contention whatever that Petitioner is now a public utility. There is nothing in the Act which indicates that if a company has once been a public utility it shall continue to be treated as such after the activities which have rendered it such have ceased. If Petitioner was a public utility but has ceased to be such, it would serve no useful purpose now to compel Petitioner to go to the vast *expense and trouble required to make up accounts and compile* and furnish information with regard to the original cost of all of its facilities for past years in the way required by the Commission.

ARGUMENT.

I.

PETITIONER IS NOT A "PUBLIC UTILITY" UNDER THE PROVISIONS OF FEDERAL POWER ACT, AND THEREFORE IS NOT CURRENTLY SUBJECT TO ACCOUNTING REGULATION BY THE FEDERAL POWER COMMISSION.

At the time of the hearing and determination of the Commission, Petitioner's electric system was not (and is not now) connected with any source of electric energy originating in another state, except at Bristol. Moreover, Petitioner's electric system was not then (and is not now) connected with any lines carrying electric energy from Connecticut to another state.

The sole claim of the Commission to current general jurisdiction over Petitioner and its accounts therefore relates to the facilities in the substation at Bristol, at which Petitioner receives the electric energy from its vendor for the supply of local retail consumers in the Bristol district.

Assuming, *arguendo*, that some electric energy from Massachusetts actually passes through such facilities, we nevertheless submit that a study of the Federal Power Act, its legislative history, and its recognized purposes discloses that the Act was never intended to endow the Commission with jurisdiction over such facilities, or with general jurisdiction over such a local distributing company.

A. THE FEDERAL POWER ACT WAS NOT INTENDED TO REGULATE A LOCAL DISTRIBUTING COMPANY LIKE THE PETITIONER, WHICH DOES NOT GENERATE, TRANSMIT OR SELL ANY ELECTRIC ENERGY CONSUMED OUTSIDE OF THE STATE IN WHICH THE COMPANY OPERATES.

1. The Primary Purpose of the Federal Power Act Was to Regulate Interstate Sales of Electric Energy and it Was not Intended to Regulate Local Distributing Companies.

In *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61, 67, 68, 70, 71, 86, both the majority and minority opinions in this Court pointed out that the Federal Power Act was designed to fill the hiatus in regulation, in respect to interstate sales of electric energy *at wholesale*, left by the decision in *Public Utilities Commission* v. *Attleboro Steam & Electric Co.* (273 U.S. 83).

Compare:

> *Public Utilities Commission* v. *Landon*, 249 U.S. 236;
> *Missouri* v. *Kansas Gas Co.*, 265 U.S. 298.

The majority opinion in the *Jersey Central* case said:

> "The primary purpose of Title II, Part II, of the 1935 amendments to the Federal Power Act . . . was to give a federal agency power to regulate the sale of electric energy across state lines. Regulation of such sales had been denied to the states by *Public Utilities Commission* v. *Attleboro Steam Co.*, 273 U.S. 83. On account of the development of interstate sales of electric energy, it was deemed desirable by Congress to enter this field of regulation." (*Jersey Central Power and Light Co.* v. *Federal Power Commission*, 319 U.S. 61, 67–8.)

The purpose thus expressed is disclosed, in part, by the declaration of policy appearing in Section 201 (a) of the Act (49 Stat. 847, 16 U.S.C. Title 16, § 824(a)), as follows:

"(a) It is hereby declared that the business of *transmitting and selling** electric energy for *ultimate* distribution to the public is affected with a public interest, and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following and of that part of such business which consists of the transmission of electric energy *in interstate commerce* and the sale of such energy *at wholesale in interstate commerce* is necessary in the public interest, such *Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.*"

In the *Jersey Central* case, *supra*, this Court held that where a New Jersey electric company generated and sold electric energy to a second company in the State of New Jersey, and a portion of such energy found its way into the State of New York (through a connection maintained by the purchaser with a third company serving ultimate consumers in New York), an electric line owned and operated by the first company, by which the energy was delivered to the second company, was a facility for "the transmission of electric energy in interstate commerce", and that the first company was a "public utility" under the Act. In holding that the Act did not contemplate the exercise of jurisdiction only where a company owns facilities which *cross* a state line, the Court again pointed to the purpose of the Act as follows:

"The purpose of this act was primarily to *regulate the rates and charges of the interstate energy.* If *intervening companies* might purchase *from producers in the state of production*, free of federal control, *cost would be fixed prior to the incidence of federal regula-*

* Throughout this brief, the italics are ours.

tion and federal rate control would be substantially impaired, if not rendered futile." (*Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61, 71–2).

Bearing in mind the "primary purposes" of the Federal Power Act, *i.e.*, to exercise control which had not previously been exercised by Congress over interstate sales of electric energy at *wholesale* (which control could not be exercised by the states) and at the same time to preserve to the states their existing powers to regulate intrastate utility companies and their local sales at retail, it is apparent that the Commission's assertion of jurisdiction in the present case is not in accord with such purposes.

Petitioner does not generate electric energy which is sold at wholesale in interstate commerce (as was the case in *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. 2d 953, certiorari denied, 319 U.S. 741); nor does Petitioner transmit electric energy which is resold at wholesale and ultimately consumed in another state (as was the case in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61). Instead of generating or transmitting, in the State of Connecticut, electric energy which is ultimately consumed outside of the State, Petitioner here *receives* energy within Connecticut *for local distribution and retail sale to consumers within the State.*

What purpose would be served by Federal regulation in such a case? Before Petitioner receives the energy and distributes the same to its consumers within the State, the Federal Power Commission presumably has *already* exercised its function of regulating the company or companies which produced the energy in Massachusetts and transmitted the same to and across the State line into Connecticut, including the regulation of wholesale rates subject to the Commission's jurisdiction. This is not a situation

where "cost would be fixed prior to the incidence of federal regulation", as was said in the *Jersey Central* case, *supra*. When Petitioner receives the energy at Bristol, the "incidence of federal regulation" has not only been reached but *passed*. In the interstate sale of the energy, the cost has already been fixed by the Commission. Thenceforth no interstate transactions take place and no federal rate control is involved. Petitioner's costs are subject to the supervision of the State of Connecticut for the purpose of regulating the intrastate retail rates. (See authorities cited on p. 35, *infra*.)

Section 208 of the Act requires every public utility upon request to file with the Commission "an inventory of all or any part of its property and a statement of the original cost thereof". This provision and others in the same section apply not only to property over which the Commission has jurisdiction but to all of the property of the company.

Section 301 requires public utilities to keep accounts, etc., as the Commission may by rules and regulations prescribe. It is apparent that the Commission construes this section as requiring a company found by it to be a public utility to keep accounts as to all of its property as the Commission may prescribe.*

Section 302 authorizes the Commission to require public utilities to keep adequate depreciation accounts and to fix adequate rates of depreciation "of the several classes of property" of each public utility in accordance with rules of the Commission. Apparently the depreciation rates thus fixed may eventually be applied not only to facilities over which the Commission has jurisdiction but also to all other facilities of the Company.

Under the present order of the Commission, Petitioner

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* See opinion and order, *In the Matter of Hartford Electric Light Company*, Docket No. IT-5560.

would be required to install the system of accounts prescribed by the Commission, and to follow the same with respect to all of its transactions in the State of Connecticut, and also to file inventories and original cost studies with respect to all of its property in the State of Connecticut. Under the determination that Petitioner is a "public utility", the Commission would possess many other regulatory powers over Petitioner, as noted elsewhere herein.

We contend that all of the purposes of the Act are fulfilled if, as here, the company which did transmit energy across the State line, i.e., the Connecticut Power Company, is subject to the jurisdiction of the Commission, and that it was not the intention of Congress to submit a local distributing company to the jurisdiction of the Commission merely because the supply which it purchased and received in the State and used in local distribution there happened to include some energy generated in another State.

2. The Legislative History of the Federal Power Act Shows that it Was Not Intended to Regulate Local Distributing Companies.

The reports of both the Senate Committee and the House Committee on the bill contained the following statement in regard to Section 201(a):

> "Subsection (a) contains a declaration of the necessity for federal regulation and *defines the scope of that regulation* . . ." Senate Report 621, 74th Congress, 1st Session, p. 48. House Report 1318, 74th Congress, 1st Session, p. 26.

The provision for jurisdiction over facilities in Section 201(a) of the Bill as reported to the Senate by the Senate Committee (designated S 2796) and as the Bill passed the Senate was as follows:

> "The Commission shall have jurisdiction over all

> facilities for such production, transmission, or sale of electric energy by any means and over all facilities connected therewith as parts of a system of power transmission situated in more than one State, *except facilities used* only for the production or transmission of electric energy in intrastate commerce or *in local distribution or* for the use of the producer or transmitter."

The House Committee on Interstate and Foreign Commerce, however, rewrote this provision and the Bill, as reported by it to the House (S 2796, with amendments), substituted for the sentence quoted above one which is substantially the same as that in the Act as passed.*

The Report of the Senate Committee on Interstate Commerce which accompanied the Bill (S 2796) in the form in which it was presented to the Senate (with the broad language quoted above) stated that it "would impose Federal regulation only over those matters which cannot be effectively controlled by the States". (Senate Report No. 621, page 18, 74th Congress, 1st Session.)

And on the floor Senator Wheeler, who was in charge of the Bill, said (Congressional Record, Vol. 79, Part 8, p. 8399):

> "Utility operations, except where they extend beyond state lines, are of course matters of local or state concern; . . .".

The Report of the House Committee on Interstate and Foreign Commerce (Report No. 1318, House of Representatives, 74th Congress, 1st Session) contained the following language (pp. 7–8):

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* The only difference is that there were inserted the words "except as specifically provided in this Part and the Part next following." This was done merely for the sake of clarification. (See p. 41, *infra*.)

"The new parts are designed to meet the situation which has been created by the recent rapid growth of electric utilities along interstate lines. The percentage of electric energy generated in the United States that was transmitted across State lines increased from 10.7 in 1928 to 17.8 in 1933. The amount of energy transmitted in interstate commerce in 1933 was greater than all of the energy generated in the country in 1913. Under the decision of the Supreme Court of the United States in *Public Utilities Commission* v. *Attleboro Steam & E. Co.*, (273 U.S. 83), the rates charged in interstate wholesale transactions may not be regulated by the States. Part II gives the Federal Power Commission jurisdiction to regulate these rates. A 'wholesale' transaction is defined to mean the sale of electric energy for resale and the Commission is given no jurisdiction over local rates even where the electric energy moves in interstate commerce.

. . . . .

"The bill takes no authority from State commissions and contains provisions authorizing the Federal Commission to aid the State commissions in their efforts to ascertain and fix reasonable charges. Provision is made for joint boards composed of members of State commissions which may be used for this purpose. The new parts are so drawn as to be a complement to and in no sense a usurpation of State regulatory authority and contain throughout directions to the Federal Power Commission to receive and consider the views of State commissions. Probably, no bill in recent years has so recognized the responsibilities of State regulatory commissions as does title II of this bill."

. . . . .

And on page 27:

> "Subsection (b) confers jurisdiction upon the Commission over the transmission of electric energy in interstate commerce and the sale of electric energy at wholesale in interstate commerce, but does not apply to any other sale of electric energy or deprive a State of any lawful authority now exercised over the exportation of hydroelectric energy transmitted out of the State. As in the Senate bill no jurisdiction is given over local distribution of electric energy, and the authority of States to fix local rates is not disturbed even in those cases where the energy is brought in from another State. As in subsection (a), the provisions of the Senate bill relating to the production of electric energy for interstate transmission and facilities for such production are omitted."

The House enacted Parts II and III in substantially the form so reported. Throughout the discussion on the floor of the House there appear abundant manifestations of Congressional purpose to preserve to the States the powers which they then had.

> See 79 Cong. Rec. Part 9, pp. 10357, 10377, 10378, 10384–10387, and Part 10, 10574.*

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* Moreover, when the Federal Power Act was under discussion upon the floor of the House, Representative Cole of Maryland, a member of the Committee on Interstate and Foreign Commerce, said of the provisions of Part II that the Committee had "tried—and I think successfully—to avoid . . . the extension thereof [of Federal control] into intrastate activities in the way that the Shreveport case might permit."

79 Cong. Rec. Part 9, 10384.

The familiar doctrine of the Shreveport case (*Houston, East & West Texas Railway Co.* v. *U. S.*, 234 U.S. 342) is that the Interstate Commerce Commission can properly regulate intrastate railroad rates where they are so low as to discriminate against and work direct injury to interstate commerce. That is the doctrine which Congress intended should not be applied in interpreting the powers of the Federal Power Commission.

The situation thus presented under the Federal Power Act is not one wherein Congress attempted to preempt the whole electric utility field to the fullest extent of its constitutional power under the commerce clause, but clearly displays a conscious effort to keep the jurisdiction asserted within defined bounds.

Under such circumstances, "the narrow question" presented is, "what Congress did, not what it could do", as in

> *Federal Trade Commission* v. *Bunte Bros., Inc.*, 312 U.S. 349, 355.

Where Congress speaks in limited terms in a field hitherto left untouched, "an intention to override existing state authority . . . is not to be imputed to the Congress unless its enactment compels that conclusion".

> *Atchison, Topeka & Santa Fe Railway Co.* v. *Railroad Comm.*, 283 U.S. 380, 391.

And this doctrine is no less applicable where the existing state authority has hitherto been exercised over matters incidentally affecting or burdening interstate commerce.

> *Townsend* v. *Yeomans*, 301 U.S. 441.

The Federal sphere of jurisdiction is to be carefully limited where, as in the present situation, the Federal act specifically provides for preservation of existing state authority.

> *Hartford Indemnity Co.* v. *Illinois*, 298 U.S. 155.

As the Court said in *Florida* v. *United States*, 282 U.S. 194, 211–212:

> "The propriety of the exertion of the [federal] authority must be tested by its relation to the purpose of the grant and with suitable regard to the principle that whenever the federal power is exerted within what

would otherwise be the domain of state power, the justification of the exercise of the federal power must clearly appear."

From the foregoing general considerations we believe it is apparent that Congress did not intend that a local distributing company, such as Petitioner, should be subject to the broad general jurisdiction of the Commission. With this background in mind, we pass to an examination of the statutory provisions relating to the Commission's jurisdiction over facilities.

B. PETITIONER'S FACILITIES AT BRISTOL ARE NOT FACILITIES "FOR THE TRANSMISSION OF ELECTRIC ENERGY IN INTERSTATE COMMERCE", WITHIN THE PURVIEW OF THE FEDERAL POWER ACT.

The Commission's authority to prescribe and order compliance with a system of accounts is contained in section 301 of Part III of the Federal Power Act (49 Stat. 854, 16 U.S.C. Title 16, § 825(a)) which, by its terms, applies only to "every licensee and *public utility.*" Since Petitioner is not a "licensee" under Part I of the Act, the Commission's authority to make the order under review in this proceeding, can exist only if Petitioner is a "public utility" within the meaning of the Act.

Jersey Central Power & Light Co. v. *Federal Power Commission*, 319 U.S. 61, 67, note 6.

A "public utility" is defined in Section 201 (e) of Part II of the Act (49 Stat. 848, 16 U.S.C. Title 16, § 824 (e)), as follows:

> "(e) The term 'public utility' when used in this Part *or in the Part next following* means any person who owns or operates facilities subject to the jurisdiction of the Commission *under this Part.*"

The facilities which are subject to the jurisdiction of the

Commission (and those which are not) are specified in subsection (b) of section 201, which governs the application of Part II of the Act and provides as follows:

> "(b) The provisions of this Part shall apply *to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy* or deprive a state or state commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a State line. *The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction*, except as *specifically provided* in this Part and the Part next following, over facilities used for the generation of electric energy *or over facilities used in local distribution* or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter."

The ultimate question in this case, therefore, is whether the facilities owned and operated by Petitioner at Bristol are subject to the jurisdiction of the Commission under the foregoing provisions.

We contend that, regardless of the effect of the above clause relating to "facilities used in local distribution", Petitoner's facilities at Bristol are not subject to the jurisdiction of the Commission because they are not facilities "for transmission of electric energy in interstate commerce" within the meaning of the Act. As this Court said in the *Jersey Central* case, *supra* (at p. 72):

> ". . . Commission power does not extend over all connecting transmitting facilities but only over those which

transmit energy actually moving in interstate commerce. Mere connection determines nothing."

The situation here is similar to that presented by cases involving gas companies.

In *Public Utilities Commission* v. *Landon* (249 U.S. 236, 245), the Court held that although the piping of natural gas from state to state, and its delivery to independent local gas companies, is interstate commerce, its retailing and delivery by the local companies to their consumers is wholly intrastate commerce and not a continuation of interstate commerce, even though the mains of the local companies are permanently connected to those of their vendors.

As Petitioner is a distributing company which does not itself transmit energy interstate, the situation here is like that discussed in *Missouri* v. *Kansas Gas Co.*, 265 U.S. 298, 308, in which the Court, speaking of the transportation of gas in a pipe line across a state line and delivery to distributing companies which then sold and delivered it to local customers, said: "With the delivery of the gas to the distributing companies, however, the interstate movement ends." In that case the Court also said (p. 309): "The business of supplying, on demand, local consumers is a local business, even though the gas be brought from another State and drawn for distribution directly from interstate mains; . . ."

See also *East Ohio Gas Co.* v. *Tax Commission*, 283 U.S. 465, 471–2; *Illinois Gas Co.* v. *Public Service Co.*, 314 U.S. 498, 504.

The situation here is also similar to that presented in such cases as *Lone Star Gas Co.* v. *Texas*, 304 U.S. 224; *South Carolina Power Co.* v. *South Carolina Tax Commission*, 52 F. 2d 515 (E.D. S.C. 1931), aff'd 286 U.S. 525; 60 F. 2d 528, aff'd *sub nomine Broad River Power Co.* v.

Query, 288 U.S. 178; *Banker Brothers Co.* v. *Pennsylvania*, 222 U.S. 210. See also *Southern Gas Corp.* v. *Alabama*, 301 U.S. 148, 154–155.

The companies which contracted to supply those loads of Petitioner which were connected with the C.P. lines (including the Bristol district) have at all times been able to obtain the necessary supply from generating plants located in Connecticut. (R. 949–953, 969–972)

Consequently, it is clear that the State Commission had jurisdiction over those contracts and over all of the facilities of Petitioner in those areas. *Peoples Gas Co.* v. *Pub. Serv. Com.*, 270 U.S. 550;* Connecticut G. S. Rev. of 1930, Section 3599.**

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* Although some of the language in this case was subsequently disapproved in *East Ohio Gas Co.* v. *Tax Commission*, 283 U.S. 465, 472, the later case did not question the power of the State Commission over the contracts involved.

** In this connection attention is called to Section 1414(c), Cumulative Supplement to General Statutes of Connecticut. This Act, which was approved and became effective on May 29, 1935, as Chapter 191 of the Public Acts, 1935, states that its general purposes "are to assure to the State of Connecticut its full power to regulate its public service corporations", etc.

Section 6 of this Chapter [Cumulative Supplement (1935) 1414(c), cl. f, p. 592] contains the following provision:

> ". . . No gas, electric or water company, or holding company, or any official, board or commission purporting to act under any governmental authority other than that of this state or of its divisions, municipal corporations or courts, shall interfere with or attempt to interfere with or exercise authority or control over any gas, electric or water company incorporated by this state and engaged in the business of supplying service within this state, or with or over any holding company incorporated by this state and doing the principal part of its business within this state, without having first obtained the approval of the commission, except as the United States may properly regulate actual transactions in interstate commerce. Any action contrary to the provisions of this section shall be voidable on order of the commission."

As appears from the language of the Act itself and its legislative history, Congress intended to preserve jurisdiction of the state over such contracts and such facilities and not to bestow jurisdiction over the contracts or the facilities upon the Federal Power Commission.

In the *Jersey Central case, supra,* the Court was dealing with a situation where it could be said (in view of the prior decisions of the Court that a sale at wholesale of electric energy which later crosses state lines is a transaction "in interstate commerce") that a transmission and sale at wholesale within the state, with *subsequent* resale at wholesale and transmission out of the state, was a "*transmission* in interstate commerce." Thus, the Court referred to the cases of *Public Utilities Commission* v. *Attleboro Steam & Electric Co.* (273 U.S. 83) and *Illinois Gas Co.* v. *Public Service Co.* (314 U.S. 498), both of which involved the sale of interstate electric energy or gas *at wholesale,* as follows:

> "Without this separation from the movement across the New Jersey-New York line, the transmission by Jersey Central would fall within the definition of commerce declared by two former decisions of this Court.
>
> "In *Public Utilities Commission* v. *Attleboro Steam Co.,* 273 U.S. 83, 86, this Court held *in interstate commerce* the sale of locally produced electric current at the state boundary with knowledge that the buyer would utilize the energy extrastate. The passage of custody and title at the line was held immaterial. We see no distinction between a sale at or before reaching the state line." (*Jersey Central Co.* v. *Federal Power Commission,* 319 U.S. 61, 69).

Such reasoning can have no application to the present situation. Petitioner here is a local distributing company, engaged in a business which does not constitute "any part of interstate commerce," either in the sale of energy

at retail for local consumption or in the delivery or distribution of such energy from the point of reception within the State to the local consumers. Under the Federal Power Act, Petitioner's rates to consumers are subject to exclusive regulation by the State of Connecticut and it makes no sales of energy which would be subject to the jurisdiction of the Commission. No Federal purpose expressed in or intended by the Act would be served by placing such a local distributing company or any of its facilities under the jurisdiction of the Commission.

The phrase "transmission of electric energy in intrastate commerce" is not defined in the Act. However section 201 (c) provides as follows:

> "(c) For the purpose of this Part, electric energy *shall be held* to be transmitted in interstate commerce if *transmitted from* a state *and consumed at any point outside thereof;* but only insofar as such transmission takes place within the United States."

If this subsection were to be construed so as to stamp as facilities subject to the jurisdiction of the Commission *all* of the electrical facilities for the conveyance of electric energy from the point of generation in one state to the point of consumption in another state, then, of course, the Court below would be right, and all facilities, including those "used in local distribution"—down to the electric bulb in a housewife's kitchen—would be subject to the jurisdiction of the Commission.

We submit that, in view of the background and purposes of the Act, it cannot be said that Congress intended to depart from the concepts of "interstate commerce" laid down in the prior decisions of this Court, so as to include in the phrase "facilities for the transmission of electric energy in interstate commerce," the facilities of a local distributing

company used to receive and deliver energy at retail for local consumption within the state.

C. "FACILITIES USED IN LOCAL DISTRIBUTION" ARE EXEMPT FROM THE JURISDICTION OF THE COMMISSION, AND ALL THE FACILITIES OF PETITIONER AT BRISTOL ARE "FACILITIES USED IN LOCAL DISTRIBUTION."

We contend that whether or not any facilities of Petitioner at Bristol are facilities "for transmission of electric energy in interstate commerce", they are "used in local distribution" and are therefore exempt from the jurisdiction of the Commission because of the provision of Section 201 (b) that the Commission "shall not have jurisdiction, except as specifically provided in this Part and the Part next following, . . . over facilities used in local distribution."

1. Facilities Used in Local Distribution Are Exempt from the Jurisdiction of the Commission.

The Commission seems to have recognized in its opinion that certain facilities would be exempt under the language of the statute quoted above. This is apparent from the discussion in its opinion (R. 75–78) and the fact that it determined that certain facilities in each of the three areas connected with the C.P. lines were "used for transmission of electric energy . . . as distinguished from local distribution thereof." See paragraphs (10), (14), and (18) of the findings. (R. 66-69)

The Court below, however, held that Petitioner's contention that jurisdiction over accounts and the like could not be based solely upon facilities used in local distribution was unsound, and that the language of the Act quoted above did not operate as an exemption, but was "intended to make it clear that this jurisdiction extends even to local facilities where the Act provides for their regulation, as it does in

the case of accounting practices", and went on to say, "Therefore, whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as 'local' is not relevant to this case." (R. 1174–1175)

The Court admitted that the construction for which Petitioner contended was a "grammatical possibility", but based its conclusions upon considerations which, we submit, totally lost sight of the structure of the Act and its legislative history.

The provision for "accounting practices", on which the Court relied, cannot of itself submit facilities of a company or its accounts to the jurisdiction of the Commission. This provision appears in Section 301 of Part III. But in determining whether the Commission has any jurisdiction over a company, Part III does not control, inasmuch as Section 201(e) in Part II provides:

> "The term 'public utility' when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under *this* Part."

Thus it is clear that Petitioner is not a "public utility" subject to the jurisdiction of the Commission solely because facilities used in local distribution may be governed by the accounting requirements applicable to a "public utility".

The matter is definitely and clearly summarized in the following extract from the opinion in *Jersey Central Power & L. Co.* v. *Federal Power Commission*, 129 F. 2d 183, 194:

> "As we have said Section 201(a) of the Act states explicitly that the federal regulation proposed by the Act is intended 'to extend only to those matters which are not subject to regulation by the States', and that Section 201(b) says with equal clarity that *the Commission 'shall not have jurisdiction* . . . over facili-

ties used for the generation of electric energy or *over facilities used in local distribution* or only for the transmission of electric energy in intrastate commerce, ...' Generation of electricity, *its local distribution* or its transmission in intrastate commerce are not within the purview of the Act or the jurisdiction of the Commission."

The legislative history of the Act demonstrates clearly that Congress did not intend to extend Federal jurisdiction to all facilities connected to "parts of a system of power transmission situated in more than one state" (from which the original bill excepted facilities for "retail distribution"),* that continual efforts were made to narrow the basis of jurisdiction originally proposed, and that the ultimate intention was to exclude "facilities used in local distribution" from the categories of facilities subjecting a company to the general jurisdiction of the Commission.

The provision for jurisdiction over facilities in Section 201(a) of the Bill as reported to the Senate by the Senate Committee (in the Bill designated S2796) and in the Bill as passed the Senate was in the form set forth on page 28, *supra*, and specifically *excepted* from the jurisdiction of the Commission "facilities used in local distribution".

The House Committee on Interstate and Foreign Commerce rewrote certain provisions of the Bill and reported it to the House (S. 2796 with amendments, Report No. 1318, House of Representatives, 74th Congress, 1st Session). As so reported, the clause applying to "facilities used in local distribution" was the same as in the Act finally passed, except that it did not contain the words "except as specifically provided in this Part and the Part next following." The House enacted the clause as reported.

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*S. 1725, 74th Cong. 1st Sess., February 6, 1935.

It is clear that the House did not intend to confer jurisdiction of the Commission over a company because of ownership of facilities used in local distribution. The Report of the House Committee contained the following language (p. 27):

> "As in the Senate bill no jurisdiction is given over local distribution of electric energy, and the authority of States to fix local rates is not disturbed even in those cases where the energy is brought in from another State."

Owing to the differences between the bills passed by the two Houses, the matter was referred to conferees.

They inserted the phrase "except as specifically provided in this Part and the Part next following." This is the first time this phrase appears, and the Report of the House conferees accompanying the Conference Report (74th Congress, 1st Session, House Report No. 1903, p. 74) asserts that it is merely "a clarifying phrase added to remove any doubt as to the Commission's jurisdiction over facilities used for the generation and local distribution of electric energy to the extent provided in *other* sections of this part and the part next following." In the light of this statement and the fact that there was no dispute between the House and the Senate as to the provision regarding local distribution, it is clear that this clause was not intended to enlarge the basis of general jurisdiction of the Commission as previously limited.

As we have pointed out above, in determining the general jurisdiction of the Commission the Part next following, *i.e.*, Part III (in which the accounting provisions appear) must be disregarded.

Consequently it is manifest that the reasoning of the Court below was fallacious. The Commission has no jurisdiction over the accounts of a company unless it is a "public

utility." Whether a company is a "public utility" depends upon whether the Commission has jurisdiction over "facilities" which it owns or operates. To say that the Commission has jurisdiction over facilities because it may regulate *accounts* for such facilities, which it may do only *if* the company *is* a "public utility," begs the question and tests the status of the company solely by reference to the results which would flow from that status if occupied by the company.

Indeed, the Court below does not seem to have considered the totality of the effect of its determination of Petitioner's status, with respect to the entire scope of the Commission's regulatory power over one who is a "public utility". The Court speaks as though all that were involved in the determination of status is the matter of accounting practices. Thus, referring to the construction urged by Petitioner, the Court said (R. 1174):

> "Such a construction is a grammatical possibility. However, it contradicts the broad purpose of the Act to correct abuses of write-ups, inflation of accounts and similar practices which have on occasion been found in the utility industry. . . . It would encourage the setting up of unnecessarily complicated accounting systems between the owners of the segments of the artificially divided power system, which the Act is designed to eliminate."

This case does not involve an "artificially divided power system." Petitioner here is not and never was affiliated in any way with the Connecticut Power Company, from which it purchases electric energy. It is a wholly independent distributing company, purchasing energy at arm's length from a stranger.

If the Federal Power Act leaves the door open to hypothetical corporate manipulations like those described in the

opinion of the Court below, it does not follow that regulation may be evaded. The state commissions have jurisdictions over companies operating local distribution systems, and that jurisdiction was intended to be preserved to them by the Federal Power Act.

If opportunity exists for corporate reorganizations which will divide an "interstate company" into segments *i.e.*, two companies, one conducting the business of transmission and selling energy at wholesale, and the other conducting the business of local retail distribution, regulation may be *divided* but it *exists* and presumably will be exercised. If such a situation requires correction, there are means of correcting it other than misconstruing the plain provisions of the Federal Power Act.

The view of the Court below would completely nullify the "but" clause. Certainly, if no electric energy from another state flows through the facilities enumerated in the "but" clause, the exemptions contained therein would be wholly superfluous. That the Congress intended the exemptions to apply even though such energy flows through the facilities is plain. For example, there would be no point in exempting "facilities for the transmission of electric energy consumed wholly by the transmitter," unless the clause applies where the energy is produced in one state and consumed in another. Nevertheless, under the construction applied by the Court below, if electric energy from another state flows through any of the facilities enumerated, they would automatically become facilities for "transmitting electric energy in interstate commerce" and the owner or operator thereof would be a "public utility" under the Act.

We submit that Congress intended no such test of the Commission's jurisdiction, but that it clearly intended to exclude from jurisdiction the facilities which it specified as not being under the jurisdiction of the Commission.

2. The Exemption of "Facilities Used in Local Distribution" Should Be Construed to Exempt All the Facilities of a Local Distributing Company Beyond the Point of Delivery of the Electric Energy to It.

The question under the Act is not whether facilities are to be characterized as "transmission" or "distribution" facilities. These are terms upon which experts may differ in their application to particular circumstances. The question under the statute is merely whether the facilities (however they may be classified in engineering practice) are actually "used in local distribution".

The discussion in the opinion of the Commission and its findings show that the Commission took too narrow a view of the scope of the exemption of facilities "used in local distribution", which it confined to facilities in the system beyond the point where "the process of subdividing the energy to serve ultimate customers, which [it said] is the characteristic of 'local distribution', is begun." (R. 75) Thus it excluded from the excepted category various facilities of Petitioner beyond the point where it received the electric energy from the Connecticut Power Company, and classified as facilities not used for local distribution not only certain lines between Torrington and Winsted and in the East Hampton area, but also the substations in those areas which lowered the voltage, and also the facilities in the substation in the heart of Bristol. (R. 66-69)

Petitioner contended there and now contends that as a matter of law the exception must be construed as embracing all the facilities owned by it beyond the point of delivery of the electric energy to it as a distributing company.

Whatever may be the power of Congress to place under the jurisdiction of a Federal agency facilities such as those under discussion, it is clear that Congress in the Act did not attempt to include—indeed it expressly excluded—all facil-

ities actually "used in local distribution". The word "used" indicates that if a facility has a use in connection with local distribution it is to be exempted even though it is also used for transmission.

In this connection, the legislative history of the Act is illuminating.

In the bill as initially presented to the Senate by Senator Wheeler (S. 1725, 74th Congress, 1st Session) Sec. 201(b) read as follows:

> "The Commission shall have jurisdiction over all facilities for such transmission, sale and/or production of energy by any means and over all facilities connected therewith as parts of a system of power transmission situated in more than one State, except facilities for the retail distribution of electric energy, or for the production or transmission of energy solely for the use of the producer or transmitter or the use of his tenants on property owned or controlled by him and not for resale."

The main objections to the bill were that it encroached upon the ambit of State regulation. The Senate Committee submitted a substitute bill in which the comparable phrase in the exception was changed to read: "facilities used only for the production or transmission of electric energy in intrastate commerce or in local distribution or for use of the producer or transmitter." This change enlarged and expanded the exception. It was no longer limited to facilities for distribution at retail but included facilities engaged in intrastate commerce and local distribution, whether the transactions involved were at retail or not. The language in the bill as finally passed, "facilities used in local distribution", is broader than the similar exceptions in earlier drafts.

It is obvious that any facility in an electric system

through which electric energy flows is used for transmission, and any attempt to classify a particular facility as one for transmission or one for local distribution must depend to considerable extent upon the emphasis which one wishes to place upon its functions.

The conception of the Commission counsel as to local distribution is so narrow that if the term, as used in the Federal Power Act, were construed to conform with their characterization, it would be largely or wholly ineffective. It is hard to conceive of any company serving a community at retail which would not have facilities for transmission as distinguished from facilities for local distribution, as those terms are used by them. In specifically exempting jurisdiction "over facilities used in local distribution" Congress intended to exempt companies which did merely a local business. The Bristol district of Petitioner under discussion is entitled to precisely the same treatment as if it were served by a single separate company.

At Bristol Petitioner's facilities, which the opinion of the Commission classified as used for transmission purposes, are all in a substation in the heart of Bristol, covering a small area. Its specific function was to change the energy from transmission voltage to distribution voltage. (R. 838–843)

That such facilities are being used for local distribution has been recognized by the Federal Power Commission itself in respect to substations in its regulations for accounting, and it has also been adopted in the Uniform System of Accounts for Electric Utilities of the National Association of Railroad and Utilities Commissioners and by the Public Utilities Commission of the State of Connecticut. In rules of all of these appears the following (Ex. 90, Par. 16; Ex. 91, Pars. 14 and 15. See also, Par. 16, p. 52, of Federal Power Commission Uniform System of Accounts, effective January 1, 1937):

"Stations which change the energy from transmission to distribution voltage shall be classified as distribution stations."

Although Commission counsel have contended that definitions relating to accounting have no application to the matter in question, we submit that they are of significance as indicating how regulatory bodies do classify substations, and that the classification by the Federal Power Commission itself is of especial weight. It is unthinkable that the Commission would have made such a classification for accounting purposes if it believed it to be untenable. The fact that other regulatory bodies have treated such substations in the same manner is ample evidence of the fact that there is justification for so regarding them.

3. All of the Facilities of Petitioner at Bristol Were Beyond the Point of Delivery of the Electric Energy to It at Its Distribution Substation.

This is undisputed. See finding (18), R. 69; R. 838–839.

The facilities at the sub-station in Bristol are described in detail by the witness Hughes, who designed the sub-station. He was assigned the task of designing a complete distribution system to replace an inadequate one which existed when Petitioner purchased the Bristol property about 1926. He testified that the power purchased comes from the 66,000 volt lines of the Connecticut Power Company. These lines are tapped by a line about a mile and a half in length, consisting of steel towers, which run to Petitioner's sub-station at Bristol. The tap line and the switching facilities are owned by the Connecticut Power Company. Petitioner owns facilities located in its sub-station, which is surrounded by a wire fence, starting with an outdoor steel structure to which the lines of the Connecticut Power Company run. All of the energy purchased is immediately distributed locally. (R. 838–844)

Consequently it is unnecessary to consider the evidence as to the specific facilities in the Bristol substation in order to come to the conclusion that they were all "used in local distribution."

D. THE COURT BELOW ERRED IN CONCLUDING THAT PETITIONER'S BUSINESS WAS "ESSENTIALLY INTERSTATE" BY REASON OF PETITIONER'S OPERATIONS PRIOR TO THE EFFECTIVE DATE OF THE ACT.

The decision of the Court seems to be based largely upon its conclusion that the system of Petitioner was "essentially interstate" and not "normally intrastate". We submit that in coming to this conclusion the Court committed fundamental errors.

The Court stresses the fact that Petitioner terminated its membership in the Connecticut Valley Power Exchange, an association for the interchange of electric energy between Connecticut and other States, before the effective date of the amendment to the Act, which produced Sec. 201. The Court states that the character of Petitioner's system can be judged from its activities and discontinuance of activities before the amendment to the Act went into effect. The reasoning of the Court is subject to several criticisms.

The first criticism of the reasoning of the Court is that it relies largely on what Petitioner did before the Act took effect. But as this Court said in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61, 72, 73, the Commission's power extends only over facilities "which transmit energy actually moving in interstate commerce" and "the determinative fact is the ownership of facilities used in transmission."

Obviously, the Commission could not acquire jurisdiction over any of Petitioner's facilities unless they were facilities over which the energy actually moved in inter-

state commerce after the effective date of the Act. We submit that its status must be determined by conditions which actually existed at the time as of which jurisdiction is asserted, not by what had happened prior to that time—and certainly not by what happened prior to the effective date of the Act.

The evidence does not show what part of the business of Petitioner was involved in its participation in the Connecticut Valley Power Exchange. As a matter of fact, it was a comparatively unimportant part of the business of Petitioner. In our view of the case, this was immaterial. Certainly it was improper for the Court to assume, in the absence of such evidence, that its participation in this Exchange rendered the business essentially an interstate business. As we have pointed out elsewhere, Petitioner had an extensive system by which it distributed energy to 107 towns, cities and boroughs in Connecticut, and undoubtedly most of the energy which it generated was used in the State. As far as we know, no study was ever made to determine how much, if any, energy from outside of the State could be regarded as coming to Petitioner's facilities prior to the effective date of the amendment.

There was no evidence that any of the facilities of Petitioner was constructed with a view to receiving energy from, or sending energy to, points outside of the State; and the fact is that none of the facilities was constructed with either of these aims in view. (See R. 842, regarding Bristol)

II.

THE COURT BELOW ERRED IN REFUSING TO WEIGH THE TESTIMONY AS TO JURISDICTIONAL FACTS.

Petitioner contended in the Court below that the findings of the Commission to the effect that Petitioner purchased electric energy for three areas connected with C.P. lines which "regularly, frequently and over substantial periods of time" included electric energy in substantial amounts transmitted from Massachusetts could not stand; and that the Court was under the duty of weighing the evidence and making its own independent determination of that jurisdictional fact. (R. 1180–1183) The Court, however, considered that the question was merely whether there was substantial evidence. (R. 1170)

As facilities are not subject to the jurisdiction of the Commission unless they transmit "energy actually moving in interstate commerce", it follows that unless it is proved that energy from outside of the state did reach Petitioner's facilities they are not subject to the jurisdiction of the Commission.

Section 313(b) of the Federal Power Act provides, "The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive."

In this connection it should be borne in mind that it is expressly stipulated in Section 313(b) of the Federal Power Act, which provides for review by the Courts, that upon the filing of the transcript therein, "such court shall have exclusive jurisdiction to affirm, modify or set aside such order in whole or in part", and that the statute contains no other provision for challenging the order of the Commission or any finding of fact upon which it is based.

The statute should not be construed in such a way as to raise grave doubt as to its constitutionality. If the statute were construed to require the reviewing Court merely to

ascertain whether there was some substantial evidence to support the findings as to *jurisdictional* facts it would be unconstitutional (1) in that it would deprive Petitioner of property without due process of law in violation of the provisions of Article V of the Amendments to the Constitution of the United States; (2) that it would curtail the powers of the Judiciary in violation of the provisions of Article III, Sec. 2 of the Constitution; and (3) that it would confer on the United States a power reserved to the State of Connecticut in violation of the provisions of Article X of the Amendments. *Crowell* v. *Benson*, 285 U.S. 22; *St. Joseph Stock Yards Co.* v. *United States*, 298 U.S. 38, 51–52; *Baltimore & Ohio R.R. Co.* v. *United States*, 298 U.S. 349, 364; *Bradley Lumber Co.* v. *National Labor Relations Board*, 84 F. 2d 97, 100 (C.C.A. 5th), cert. den. 299 U.S. 559; *National Labor Relations Board* v. *Cherry Cotton Mills*, 98 F. 2d 444, 446 (C.C.A. 5th). See also *United States* v. *Appalachian Electric Power Co.*, 107 F. 2d 769, 791 (C.C.A. 4th), reversed 311 U.S. 377 (see pp. 403, 404); *Ohio Valley Water Co.* v. *Ben Avon Borough*, 253 U.S. 287.

The evidence in regard to the jurisdictional question as to whether electric energy transmitted from Massachusetts reaches the facilities of Petitioner is discussed in Appendix B, pp. 68 to 79, *infra*.

III.

PETITIONER WAS NOT A "PUBLIC UTILITY" UNDER THE PROVISIONS OF THE FEDERAL POWER ACT AT ANY TIME SINCE THE EFFECTIVE DATE OF THE 1935 AMENDMENTS TO THE ACT.

A. THE FACILITIES OWNED AND OPERATED BY PETITIONER FOR THE SUPPLY OF ITS EAST HAMPTON DISTRICT, UNTIL JUNE 30, 1939, AND ITS TORRINGTON-WINSTED DISTRICTS, UNTIL JUNE 17, 1941, WERE NOT SUBJECT TO THE JURISDICTION OF THE FEDERAL POWER COMMISSION.

All that we have said with reference to the present situation at Bristol (under Point I, *supra*) applies with equal force to the situation which existed in the past with reference to the East Hampton and Torrington-Winsted districts.

The mere fact that Petitioner in these districts received electric energy at one point within the state (but not at the state line) and conveyed it to other points in the state for delivery to local consumers does not bring the facilities used for that purpose within the jurisdiction of the Commission.

The situation in regard to the facilities in these districts is explained on pp. 6–10, *supra*.

In these districts, as in the Bristol district, the receipt of the electric energy from Petitioner's vendors terminated the interstate journey of the energy. Moreover, all of the facilities in these two districts come within the exemption of "facilities used in local distribution".

B. THE FACILITIES OWNED AND OPERATED BY PETITIONER UNTIL FEBRUARY 28, 1941, FOR THE TRANSMISSION AND SALE OF ELECTRIC ENERGY TO THE BOROUGH OF GROTON, A MUNICIPAL CORPORATION, WERE NOT SUBJECT TO THE JURISDICTION OF THE FEDERAL POWER COMMISSION.

Petitioner transmitted and sold electric energy at wholesale to the Borough of Groton, a municipal corporation in Connecticut. This Borough has the charter right to carry on the business of distributing power within certain limits. (Finding, R. 64; see also R. 168, 169, 171–173, 180; Ex. 77, R. 1148)

After delivery of the energy to the Borough of Groton, some of it was distributed to numerous customers of the Borough located on its distribution system in Connecticut. Some of the rest was transformed from 33,000 volts, at which it was delivered, to 6600 volts at a substation owned by the Borough and then at another substation owned by the Borough some of it was transformed to 2300 volts. Part of the energy going to this point was distributed to local customers in Connecticut and the rest went to a substation connected with cables going to Fishers Island, New York. None of the facilities between the substation first mentioned and Fishers Island was owned by Petitioner in recent years. (R. 100–101, 180–182, 199–203, 206, 532–533)

The energy purchased by the Fishers Island Company from the Borough amounted to about one-third of the total amount of energy purchased by the Borough from Petitioner, but to only about 1/5 of 1% of all of the energy supplied by Petitioner in each year to all of its customers. (R. 216, 834–836)

The energy was purchased by the Borough of Groton from Petitioner under contracts which made no mention of sale of the energy by the Borough to the Fishers Island Company, but Petitioner knew that some of the energy was

being supplied by the Borough to the Fishers Island Company. (R. 93-107, 193)

In February, 1941, prior to the hearing before the Commission, connections were cut and facilities were dismantled so that transmission to Fishers Island was no longer possible. (R. 196-197, 209-215, 608)

We submit that the sales to Groton and the facilities used in connection therewith did not submit Petitioner to jurisdiction of the Commission for two distinct reasons.

I. Under the Provisions of the Federal Power Act, the Federal Power Commission Did Not Have Jurisdiction Over Facilities of Petitioner Used in Connection with the Sale of Electric Energy to a Municipal Corporation.

Section 201(b) of the Act confers jurisdiction over "the sale of electric energy at wholesale in interstate commerce . . .", and Section 201(d) defines the term "sale of electric energy at wholesale" as meaning "a sale of electric energy to any *person* for resale". Subsection (4) of Section 3 defines "person" as "an individual or a corporation", and subsection (3) of Section 3 defines "corporation" as not including "municipalities as hereinafter defined." Subsection (7) of Section 3 defines municipality as a "political subdivision or agency of a state competent under the laws thereof to carry on the business of developing, transmitting, utilizing, or distributing power."

Moreover, Section 201(f) contains the following:

> "No provision in this part shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State . . . unless such provision makes specific reference thereto."

The Borough of Groton is a municipal corporation and as such, of course, is a political subdivision of a state. It has authority to distribute power.

The words of the statute are clear. Accordingly, we submit that the sales to Groton are not sales of the character which submits facilities used in connection therewith to the jurisdiction of the Commission.

The cases cited in the opinion of the Commission (R. 78) state that it must be contemplated that a municipality has the right to have the Commission supervise its contracts with companies selling to it at wholesale, in view of the provisions of Sections 306 and 313, which give municipalities the right to complain to the Commission, to apply for a rehearing, and to obtain a review in court. The reasoning is that the only sales over which the Commission has jurisdiction are sales at wholesale and consequently the only sale in which a municipality would be seriously interested would be a sale direct to the municipality. We submit that further consideration of the Act will demonstrate that this is not so.

Thus the provisions in Sections 306 and 313 give rights to "any person, State, municipality or State commission." Obviously, the rights of a state commission to be heard are not predicated upon or limited to sales to a state commission, because such sales could not have been contemplated. It seems manifest that official bodies, such as municipalities, municipal commissions, and state commissions, are given certain rights in respect of transactions to which they are not parties but in which they may feel they should represent some public interest. A municipality might desire to institute a complaint or participate in a controversy involving wholesale rates to a company serving its inhabitants.

It is also significant that Sections 306 and 313 apply to all parts of the Act. In this connection it is noteworthy that licenses to construct dams and the like may be issued to municipalities under Section 4(e), and that numerous other provisions of the Act are applicable to municipalities.

Among these are 4(f), 7(a), 10(c), 10(e), 14, 19, 23(b), 301, 302, and 304. For Code references see U.S.C. Title 16, § 797(f); 800(a); 803(c); 803(e); 807; 812; 817; 825; 825(a); 825c.)

It is consequently evident that there is ample scope for applying the provisions of Sections 306 and 313 to a municipality without construing them as overriding the language of Sections 201(d) and (f).

The opinion of the Commission also states that as this contention "is based solely upon the definitions of 'sale at wholesale', it obviously cannot apply to 'transmission in interstate commerce', even though such transmission is to a municipality." (R. 78)

But we submit that under no reasonable interpretation would the statute exclude the facilities of a company from the jurisdiction of the Commission because related to a sale to a municipality and at the same time nullify the exclusion by subjecting the seller to jurisdiction because of the transmission connected with such sales.

Obviously the sales from the Borough to Fishers Island Company were beyond the jurisdiction of the Commission, and it possessed no authority to regulate the rates charged by the Borough upon such sales. The Commission itself has said:

> "Section 201(f) was expressly inserted in Part II of the Act (and to apply to that part only) to inhibit the regulation of, among other things, the activities of a municipality or other state agency engaging in the transmission or sale at wholesale of electric energy in interstate commerce." (*Re Otter Tail Power Co.*, 33 P.U.R. (N.S.) 257, 261.)

The Borough of Groton, therefore, could charge any rate which it could persuade the Fishers Island Company to pay, without let or hindrance by the Federal Power Commission; and the retail rates charged by the Fishers Island Company

were subject to exclusive regulation by the New York Public Service Commission. In such circumstances, no "incidence of federal regulation" occurred, and it cannot be said that without general jurisdiction of the Commission over Petitioner "federal rate control would be substantially impaired, if not rendered futile." (*Cf. Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U.S. 61, 72.)

It seems clear that Congress intended to deny the Commission jurisdiction over anything based upon purchases by a municipality or sales by a municipality. If the transaction with the municipality is beyond the jurisdiction of the Commission, there is no reason for it to have jurisdiction over facilities merely because they were connected with such a sale.

2. In any Event the Resale of Energy by the Borough of Groton to Fishers Island Should be Disregarded Under the Doctrine of de minimis non curat lex.

The territory served directly by Petitioner covers a substantial part of the State of Connecticut. It serves electric energy in 107 towns, cities, and boroughs, which have a total population of abut 660,000, not including about 130,000 served by other Connecticut utilities purchasing substantially all of their electrical requirements from Petitioner. (R. 86-87)

The amount of energy which was transmitted to Fishers Island was only about 1/5 of 1% of all the energy generated and received by Petitioner. But if the sales to Groton or the transmission facilities used in them are held subject to the jurisdiction of the Commission, the result is not merely to submit these particular sales and facilities to the jurisdiction of the Commission, but, as pointed out above to submit a very large part of the activities of Petitioner's entire business to the jurisdiction of the Commission. Among other things this will require compilation of an in-

ventory of all of its property with a statement of the original cost thereof, a tremendous undertaking which it is estimated will involve an expense of about $400,000.

It is incredible that Congress intended to give the Commission such jurisdiction over a company because it had facilities which were used in connection with such an infinitesimal part of its business. This Court in the *Jersey Central* case appears to have recognized that the *de minimis* rule might be applicable to such a situation. (Footnote 4 of the majority opinion.)

The Court below also seemed to recognize that the *de minimis* rule might be applicable to such a situation, but it refused to apply it because it concluded that the history of Petitioner's operations removed all doubt as to its "essentially interstate character", and indicated that the business of Petitioner was not normally an intrastate business.

This, we submit, reveals a complete misunderstanding of the nature of Petitioner's business. Although prior to the passage of the Act some of its generating plants were connected with lines which transmitted energy to Massachusetts, the production of energy for use in Massachusetts was only a small part of the business of Petitioner, which generated large amounts of energy and transmitted them from its generating plants to about 100 towns, cities, and boroughs in Connecticut which it served with electricity. Before the Act went into effect, the connection of its generating plants with the lines going to Massachusetts was severed, and after that if Petitioner was engaged in interstate business at all it was only because of the extremely small amount of energy supplied indirectly to Fishers Island, New York, and because of the fact that some of the energy which it received from the Connecticut Power Company happened to come from sources in Massachusetts.

although Petitioner contracted for no energy from such sources.*

IV.

PETITIONER IS NOT NOW A PUBLIC UTILITY WITHIN THE MEANING OF THE FEDERAL POWER ACT, AND NO USEFUL PURPOSE WOULD BE SERVED IN REQUIRING IT TO COMPLY WITH ORDERS APPLICABLE TO PUBLIC UTILITIES EVEN IF IT HAS BEEN SUCH A PUBLIC UTILITY AT ANY TIME.

Even if it should be held that Petitioner has engaged in some activities or has had some facilities which rendered it a public utility, it does not follow that it is still subject to the jurisdiction of the Commission. There have been several changes which might change its status.

Thus, there is no possibility that Petitioner is now a public utility because of its connections with the Borough of *Groton* or its transactions there. For, as indicated in findings of the Commission, none of the energy sold to Groton has been transmitted outside of Connecticut since February, 1941. (R. 64) The cables connecting Fishers Island with the Borough of Groton have been severed and other facilities over which the energy flowed to Fishers Island have been dismantled. (R. 196–197, 209–215, 608)

Petitioner's facilities in the *East Hampton* area have not been connected with the C.P. lines since July 1, 1939, but since that time have been supplied entirely by energy generated in Petitioner's own plants in Connecticut. (R. 66 (9))

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*As indicated above, Petitioner had no occasion to determine whether any electric energy was received from Massachusetts, and we contend that it has not been shown that it did receive such energy after the Act went into effect in 1935.

Petitioner's facilities at *Torrington* have not been connected with the C.P. lines since June, 1941.*

Consequently, unless it should be held that some of Petitioner's facilities at *Bristol* render it subject to jurisdiction of the Federal Power Commission under the Act, there is no ground for any contention whatever that Petitioner is a "public utility".

There is nothing in the Act which indicates that if a company has once been a "public utility" it shall continue to be treated as such after the activities which have rendered it such have ceased.

The Federal Power Commission itself appears to have recognized the fact that its jurisdiction under Part II of the Act is dependent upon the continuation of interstate activities. *In the matter of the Twin State Gas and Electric Company,* 33 P.U.R. (N.S.) 39.

Conceivably it might be contended that if Petitioner was a public utility, but had ceased to be such, it should nevertheless comply with orders which were applicable to it during the time when it was a public utility.

The orders applicable to public utilities which are mentioned in the order to show cause relate to accounting, and the like. We submit that if Petitioner was a public utility but has ceased to be such, it would serve no useful purpose now to compel Petitioner to make up accounts for past

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* Petitioner arranged to connect its own generating plants with its Torrington-Winsted line. For years it has owned the right of way from Waterbury to Torrington. At the time of the hearing it was anticipated that within a comparatively few weeks the only source of supply for the Torrington-Winsted area would be Petitioner's own plants, and that, as soon as the work previously started should have been completed, the contract with the Torrington Company would be terminated pursuant to agreement of the parties and under no circumstances would this district receive any supply from C.P. lines 1 and 2. (R. 136–143) The work was completed in October, 1941, and since that time the sole source of supply of this area has been Petitioner's own plants.

years in the way required by the Commission. Obviously, this would involve a great deal of time and expense, and no practical benefit would result therefrom.

Similarly it would be a mere waste of time to require Petitioner to compile and furnish information in regard to the original cost of all of its facilities, if none of them is now subject to the jurisdiction of the Commission.

V.

CONCLUSION.

Petitioner has not been, since the enactment of the 1935 Amendments to the Federal Power Act, and is not now, a "public utility" within the meaning of the Act, nor subject to regulation by the Commission in respect to accounting or otherwise.

The judgment of the Court below should be reversed and set aside.

Respectfully submitted,

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NOVEMBER, 1944.

APPENDIX A.

STATUTES INVOLVED.

FEDERAL POWER ACT.

Act of August 21, 1935, C. 687, Title II (49 Stat. 838).

PART I—REGULATION OF THE DEVELOPMENT OF WATER POWER AND RESOURCES

SECTION 3.* The words defined in this section shall have the following meanings for purposes of this Act, to wit:

* * * * * * * * *

(3) "corporation" means any corporation, joint-stock company, partnership, association, business trust, organized group of persons, whether incorporated or not, or a receiver or receivers, trustee or trustees of any of the foregoing. It shall not include "municipalities" as hereinafter defined;

(4) "person" means an individual or a corporation;

* * * * * * * * *

(7) "municipality" means a city, county, irrigation district, drainage district, or other political subdivision or agency of a state competent under the laws thereof to carry on the business of developing, transmitting, utilizing, or distributing power.

* * * * * * * * *

PART II—REGULATION OF ELECTRIC UTILITY COMPANIES ENGAGED IN INTERSTATE COMMERCE

Declaration of Policy; Application of Part; Definitions.

SECTION 201. (a)** It is hereby declared that the business of transmitting and selling electric energy for ultimate distribution to the public is affected with a public interest,

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* 49 Stat. 838, U.S.C. Title 16, § 796.

** 49 Stat. 847, U.S.C. Title 16, § 824(a).

and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following and of that part of such business which consists of the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce is necessary in the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.

(b)* The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a State line. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

(c)** For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States.

(d)*** The term "sale of electric energy at wholesale"

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* 49 Stat. 847, U.S.C. Title 16, § 824(b).

** 49 Stat. 848, U.S.C. Title 16, § 824(c).

*** 49 Stat. 848, U.S.C. Title 16, § 824(d).

when used in this Part means a sale of electric energy to any person for resale.

(e)* The term "public utility" when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part.

(f)** No provision in this Part shall apply to or be deemed to include, the United States, a State or any political subdivision of a State, or any agency, authority, or instrumentality of any one or more of the foregoing, or any corporation which is wholly owned, directly or indirectly, by any one or more of the foregoing, or any officer, agent, or employee of any of the foregoing acting as such in the course of his official duty, unless such provision makes specific reference thereto.

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PART III—LICENSEES AND PUBLIC UTILITIES; PROCEDURAL AND ADMINISTRATIVE PROVISIONS.

Accounts, Records, and Memoranda.

SECTION 301. (a)*** Every licensee and public utility shall make, keep, and preserve for such periods, such accounts, records of cost-accounting procedures, correspondence, memoranda, papers, books, and other records as the Commission may by rules and regulations prescribe as necessary or appropriate for purposes of the administration of this Act, including accounts, records, and memoranda of the generation, transmission, distribution, delivery, or sale of electric energy, the furnishing of services or facilities in connection therewith, and receipts and expenditures with

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* 49 Stat. 848, U.S.C. Title 16, § 824(e).

** 49 Stat. 848, U.S.C. Title 16, § 824(f).

*** 49 Stat. 854, U.S.C. Title 16, § 825(a).

respect to any of the foregoing: *Provided, however,* That nothing in this Act shall relieve any public utility from keeping any accounts, memoranda, or records which such public utility may be required to keep by or under authority of the laws of any State. The Commission may prescribe a system of accounts to be kept by licensees and public utilities and may classify such licensees and public utilities and prescribe a system of accounts for each class. The Commission, after notice and opportunity for hearing, may determine by order the accounts in which particular outlays and receipts shall be entered, charged, or credited. The burden of proof to justify every accounting entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry, and the Commission may suspend a charge or credit pending submission of satisfactory proof in support thereof.

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Rehearings; Court Review of Orders.

SECTION 313. (a)* Any person, State, municipality, or State commission aggrieved by an order issued by the Commission in a proceeding under this Act to which such person, State, municipality, or State commission is a party may apply for a rehearing within thirty days after the issuance of such order. The application for rehearing shall set forth specifically the ground or grounds upon which such application is based. Upon such application the Commission shall have power to grant or deny rehearing or to abrogate or modify its order without further hearing. Unless the Commission acts upon the application for rehearing within thirty days after it is filed, such application may be deemed to have been denied. No proceeding to review any order of the Commission shall be brought by any per-

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* 49 Stat. 860, U.S.C. Title 16, § 825*l*(a).

son unless such person shall have made application to the Commission for a rehearing thereon.

(b)* Any party to a proceeding under this Act aggrieved by an order issued by the Commission in such proceeding may obtain a review of such order in the Circuit Court of Appeals of the United States for any circuit wherein the licensee or public utility to which the order relates is located or has its principal place of business, or in the United States Court of Appeals for the District of Columbia, by filing in such court, within sixty days after the order of the Commission upon the application for rehearing, a written petition praying that the order of the Commission be modified or set aside in whole or in part. A copy of such petition shall forthwith be served upon any member of the Commission and thereupon the Commission shall certify and file with the court a transcript of the record upon which the order complained of was entered. Upon the filing of such transcript such court shall have exclusive jurisdiction to affirm, modify, or set aside such order in whole or in part. No objection to the order of the Commission shall be considered by the court unless such objection shall have been urged before the Commission in the application for rehearing unless there is reasonable ground for failure so to do. The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive.

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* 49 Stat. 860, U.S.C. Title 16, § 825*l*(b).

APPENDIX B.

THE FINDINGS OF THE COMMISSION TO THE EFFECT THAT PETITIONER PURCHASED ELECTRIC ENERGY FOR THE THREE DISTRICTS CONNECTED WITH THE C. P. LINES WHICH "REGULARLY, FREQUENTLY AND FOR SUBSTANTIAL PERIODS OF TIME INCLUDED ELECTRIC ENERGY IN SUBSTANTIAL AMOUNTS TRANSMITTED FROM MASSACHUSETTS" CANNOT STAND.

(1) CONTRACTS CALLED FOR A SUPPLY FOR THESE THREE DISTRICTS FROM GENERATING PLANTS IN CONNECTICUT, AND SINCE THE BILLING TO PETITIONER WAS BASED ON PRODUCTION COSTS AT A STEAM GENERATING PLANT IN HARTFORD, CONNECTICUT, PETITIONER HAD NO REASON TO CONCERN ITSELF WITH ANY POSSIBLE FLOW OF ENERGY FROM MASSACHUSETTS.

For the specific facts establishing these conclusions, with reference to the evidence proving them, see p. 9, *supra*.

(2) THE COMPANIES FROM WHICH PETITIONER PURCHASED ENERGY WERE AT ALL TIMES ABLE TO SUPPLY PETITIONER'S FULL REQUIREMENTS FOR THESE THREE DISTRICTS FROM GENERATING PLANTS IN CONNECTICUT CONNECTED WITH C.P. LINES 1 AND 2, AND AT NO TIME WERE THE COMBINED LOADS OF PETITIONER IN THESE DISTRICTS GREATER THAN THE AMOUNT GENERATED CONTEMPORANEOUSLY BY SUCH PLANTS.

The capacities of the steam plants of the Hartford Company which were connected with C.P. lines 1 and 2 were always 124,000 k.w. or more, that of the South Meadow plant alone now being 130,000 k.w. (R. 969–970) The generating capacity of the South Meadow plant in Hartford was at all times greater than the contemporaneous maximum demand on the Hartford's own system plus that on C.P. lines 1 and 2. (R. 971–972)

The maximum amount purchased at any time by Petitioner for its three areas under discussion was less than

20,000 k.w. (R. 952-953) At no time since January 1, 1937,* were the combined loads of these three areas of Petitioner on C.P. lines greater than the amount generated contemporaneously by generators located in Connecticut, connected with C.P. lines 1 and 2. (R. 949-953)

(3) ALL THE ESTABLISHED FACTS ARE CONSISTENT WITH THE CONCLUSION THAT ALL OF THE ELECTRIC ENERGY FURNISHED TO PETITIONER IN THESE THREE DISTRICTS WAS GENERATED IN CONNECTICUT.

The Court below seems to have misunderstood the evidence and our contentions in regard to the evidence.

Thus the opinion states that the statute "makes the test of whether such energy is actually transmitted between the two states the simple and practical one of reading a meter" (R. 1176), but the evidence demonstrated clearly that in the situation which obtained here the reading of a meter would not show the source of the energy.

The facilities of the Petitioner in question were at all times connected with generating plants in Connecticut which contemporaneously generated more than the combined loads of these three areas of the Petitioner. (R. 949-953) As the engineer of the Commission admitted, there were no meters which showed the source of the energy which reached the facilities of the Petitioner.** The gener-

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* January 1, 1937, was taken as a starting point in view of the fact that counsel for the Commission indicated that they had no evidence upon which to base any contention in respect of these areas prior to January 1, 1937. January 1, 1937, is first date mentioned in the findings relating to these three areas. (R. 66-69)

** The following are extracts from the testimony of the Commission's engineer, Thomas (R. 601-603):

"Q. Now, I think that you testified in effect that there were instruments for determining the flow of energy and the rate of flow that you designated as watt-meters or watt-hour meters; is that correct? A. I remember stating that.

ating plants in Connecticut were nearer these loads of the Petitioner than were the generating plants in Massachusetts. (See R. 1113) In these circumstances we contend that, as distinguished experts testified, there was no established principle by which it could be shown that any energy from Massachusetts reached the facilities of the Petitioner. (R. 772–776, 864–865, 873)

We did not suggest, as the opinion implies, that there was any "distinction between electric current as measured on a meter and electric energy . . . within the contemplation of Congress when it passed the Act."

As the energy actually generated in Connecticut connected with the C.P. lines was at all times sufficient to supply the demands of Petitioner, there was no convincing

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"Q. Such meters, of course, do not show the source of the energy, do they? A. Well, the meter itself doesn't have a marking on it to show where it came from. In Mr. Miller's case, the meter doesn't show red and blue or anything of that sort.

"Q. And of course there is not at Bristol or Winsted or any of the East Hampton District any instrument which shows the source of the energy that was received there at any time? A. No, not that you can determine from the reading on the instrument.

"Q. And as a matter of fact it is impossible by examining or by any other observation that you can make of energy at a particular point, to know where it is generated? A. I think that is correct.

* * *

"Q. Let me ask you a specific question. Let us assume that there is energy put on the CP line No. 1 from Falls Village, and there is also energy put on that line from Hartford. There is no physical observation or no reading of any meter on that line that would enable you to determine at any particular point what proportion of the energy came from one source and what from the other? A. Well, the instruments that are put on the line are only intended to read the total. So, of course—

"Q. And the— A. So, of course, they wouldn't indicate parts. They are not intended for that purpose."

evidence that any energy from Massachusetts ever went to Petitioner's facilities.

Electric energy is, of course, intangible, and has a complete lack of identifiable individuality. It was agreed by all of the experts that electrical energy loses its identity when put upon a conductor with energy from another source, and that, where several generators are connected with a system upon which there are several different loads, it is impossible by physical means to determine the origin of any energy supplied to a particular load. (R. 558, 601, 622, 772, 872) The two experts who testified for Petitioner, Slepian and Lewis, stated positively that in the situation which has obtained here there is no established principle by which energy in any load of Petitioner may be identified as to source and that, upon the undisputed facts it is impossible to prove by any method that any energy from Massachusetts reached the facilities of Petitioner. (R. 772–776, 864–865, 873) We submit that the conclusions of the Commission to the contrary are not proved.

The chief basis for the Commission's conclusion to the contrary was opinion evidence presented by two employees of the Commission, Miller and Thomas.

No opinion supporting the views of the Commission was expressed by any witness except these two.

Miller concluded that during certain hours on 21 days of which he made careful analyses and probably at numerous other times the loads of Petitioner at East Hampton, Bristol, and Winsted were supplied in whole or in part with energy generated outside of Connecticut. (R. 449–454, 470–471)

The foundation of his conclusions was the reading of watt-hour meters at the South Meadow substation of the Connecticut Power Company. These readings were not made for the purpose of tracing the source of supply to any load, and it does not appear that prior to Miller's

examination any effort had ever been made to identify the source of energy from them. He, however, used them as a basis for such a study. (Exs. 61 and 62, R. 414–415) He assumed that the transmission or flow of energy in an electric circuit is a traceable process; that the flow of energy must be in only one direction at any one time; and that from the reading of watt-hour meters (which showed the average product of voltage, current, and time) one can trace the flow of energy from its point of origin to its point of consumption. On these assumptions an attempt was made to trace the energy on the Hartford-Agawam line from Massachusetts to the South Meadow substation and thence to points on the C.P. lines. He also assumed that energy generated at Falls Village, Connecticut, at the other end of the C.P. line, could at a given time flow only in a direction which similar assumptions as to the readings of watt-hour meters near that end of the line indicated to him. (See R. 557–560, 569–571)

From cross-examination of Miller it was apparent that he himself did not have sufficient scientific knowledge of the principles upon which he acted to support them. Although he was trained as an electrical engineer and had held various positions which may have increased his scientific knowledge, during a considerable part of the time prior to his coming to the Federal Power Commission he had not been engaged in scientific work of any kind and the scientific work in which he had been engaged had not been such as to give him any particular qualifications as an expert as to the engineering aspects of the subject-matter of his studies. He had never made any such studies prior to the time when he came to the Commission in May, 1935. He had not either before or since coming to the Commission conducted any experiments or done anything else which enabled him to support his assumptions with anything more

than his flat statement that these principles were sound. (R. 559–560, 569–574)

Such support as there was for his assumptions came from the testimony of another member of the Commission's staff, Thomas, who evidently was presented as an expert qualified to express opinions in regard to the principles involved in Miller's study.

Thomas, upon cross-examination, admitted that Miller's conclusions were premised upon the assumption that there could not be a simultaneous flow of electrical energy in opposite directions past a given point in a conductor, and it is quite evident from analysis of the process of Miller's reasoning, as well as from the testimony of the experts called by Petitioner, that this assumption was the very keystone of Miller's studies. (R. 488–490, 559–560, 600) For if counter-flow of energy can occur, then it may be assumed that all the Massachusetts energy which reached the South Meadow substation in Hartford supplied the loads of the Hartford company in the vicinity of Hartford while Petitioner's loads were supplied by energy generated nearer them—i.e., at the South Meadow plant in Connecticut. (R. 772–774, 864, 872–873)

Thomas on direct examination stated that the impossibility of counter-flow was a "universally accepted hypothesis." (R. 491) This statement is sufficiently disproved by the fact that two eminent engineers, Dr. Joseph Slepian and Dr. W. A. Lewis, stated emphatically that this principle was not recognized among engineers as a basis for the conclusions which Thomas rested upon it. (R. 772–777, 864)

Slepian and Lewis testified that the simultaneous counter-flow of electric energy has been demonstrated "insofar as any flow can be demonstrated", and pointed out various examples. *The assertion that a single telephone or tele-*

graph wire or circuit may transmit messages in both directions simultaneously was not contradicted. (R. 803, 865-869)

Dr. Slepian studied at Harvard, in Germany, and in France; taught at Cornell; has been with the Westinghouse Electric & Manufacturing Company for over twenty-five years; and now holds the position of Associate Director of Research in that company. He has written books and many technical papers, has received prizes for such papers, and is a Fellow of many learned societies. He is also an inventor of distinction. For twenty-five years he has devoted himself chiefly to technical problems relating to generation, distribution and utilization of electric power. A detailed statement in regard to his education, experience, and achievements appear in R. 767–768.

Dr. Lewis is Director of the School of Electrical Engineering at Cornell University. He had been an engineer in the Westinghouse Electric & Manufacturing Company for ten years before joining the staff at Cornell, and during that time his duties consisted of investigations and studies in connection with the transmission of electric power. A fuller statement of his education and experience appears in R. 860–862.

Thus it is evident that both of these experts were men who had large experience of a practical, as well as of a theoretical, nature; and it is important to note that they had graduate training in the fundamental sciences, along lines of scientific rigor. On the other hand, the Commission witnesses, Miller and Thomas, have been engaged entirely in applications where questions of rigorous validity seldom arise.

It did not appear that Thomas had had any particular occasion to consider the possibility of simultaneous counterflow or, indeed, that he had ever considered it at all until called upon by the Federal Power Commission to do so for the purposes of investigations to establish the extent of Fed-

eral Power Commission jurisdiction. (R. 603–604, 625) He admitted that he had performed no experiments, and he offered no authority, other than his own assertions, either in his testimony when originally called or in his testimony when called in rebuttal, to disprove the statements of Slepian and Lewis that it is impossible to demonstrate that counter-flow does not take place. (See R. 604–607) He did admit that engineers often consider two currents as existing separately in an electrical conductor at certain times. (R. 593) He always qualified any such admission, however, by stating that this was not the physical fact (R. 593), although it seems perfectly clear from his testimony as well as from that of Slepian and Lewis that there is no physically verifiable means of determining whether this is or is not the fact. (R. 603–605)

We submit that the method used by the Commission engineers to trace energy from Massachusetts to the property of Petitioner is invalid and incapable of scientific proof.

The fundamental reason why this method is invalid is that it takes an assumption which is made in the industry for a strictly limited purpose, in which the validity of the assumption is not vital, and employs it as the factual basis for a conclusion completely foreign to the purpose for which the assumption was used in the industry. It assumes that the readings of watt-hour meters in lines running to and from the South Meadow bus indicate unique flows of energy. It further assumes that from such flows one can determine the source of energy utilized by a given load. Slepian and Lewis strongly censured the use of such assumptions for the purpose of determining the source of energy (R. 774, 782, 783, 873)

Numerous examples are cited in the testimony of Slepian and Lewis of concepts regularly used in electrical engineering in which the current is resolved into components; and these concepts lead, by the same method of relating energy

flow to current flow as used by Thomas (R. 596), to other dispositions of the energy flow. Yet all of these concepts, properly used, yield the same results in so far as any actual measurements are concerned. In many cases these concepts have measurable identity, that is, the component may be shown by a suitable meter. (R. 776–777; 865–870)

Thomas admitted that the conclusions which he expressed in support of Miller's diagrams were based upon circumstantial evidence. (R. 1007–1009) In scientific matters, however, the acceptance of conclusions based upon circumstantial evidence is certainly not valid unless the given set of circumstances leads to only one set of conclusions. But it is clear from the foregoing that in this case the same set of circumstances leads to alternative conclusions, no one of which can be proved by any sound scientific reasoning to be uniquely valid. The other conclusions must therefore be accorded equal weight until additional scientific evidence is discovered. (R. 782)

The discussion of this matter in the opinion of the Commission (R. 79–81) indicates that its conclusion as to this point is based upon several misapprehensions.

The opinion is misleading in stating (R. 81):

> "That Respondent's expert and other witnesses did not testify that the method of tracing the flow of electric energy used by the Commission's staff engineers was erroneous, is, under the circumstances, highly significant."

These experts did state that the hypothesis which the Commission's engineer used "is not made customarily in the operation of power systems", that the method of proof adopted "was not satisfactory", that they knew "of no established principle" with which it conformed, that it might lead to "ridiculous or at least non-uniquely determinable results", that it had no "scientific basis", and that for these

reasons it was "wrong" and "incorrect." (R. 774, 782, 828, 864, 873)

In the next paragraph (R. 81) the opinion states that the "views of Respondent's experts were limited to observing solely the mathematical equality, or lack of equality, of generation and load." It then alludes to answers to certain questions about a theoretical situation, with unconnected generators and loads in Shanghai, China, and Hartford, and concludes: "An expert's opinion which regards such an unreal postulate as equally valid with the conclusion that the respective loads are carried by the local generators, as shown by meters on the connecting electric circuits, appears to us wholly worthless for the practical purpose of administering the Federal Power Act."

This again gives an incorrect picture of the situation. The answers of Dr. Slepian, to which reference is made in this part of the opinion, were to questions of an entirely hypothetical nature, and it is clear from a complete reading of his testimony that he treated them as such and not as questions applying to any actual situation. Indeed, he pointed out the importance of connection and stated that the theoretical situation which was suggested was impossible. (R. 810–816)

The opinion also indicates that the Commission engineers were merely using the meter readings for the same purpose for which they are commonly used in the industry, and in doing so it evidently relies upon the testimony of Mayott, the manager of the Connecticut Valley Power Exchange. The inference which the Commission draws from his testimony is erroneous.

In daily practice watt-hour meters can be and are used to record the resultant flow of energy, but the energy components giving this resultant can be recorded only in special cases. Although it is possible to determine the direction of flow of the resultant energy from the meter reading, the

direction of any single component is thus not determined unless all other components and the resultants are known. (See R. 774)

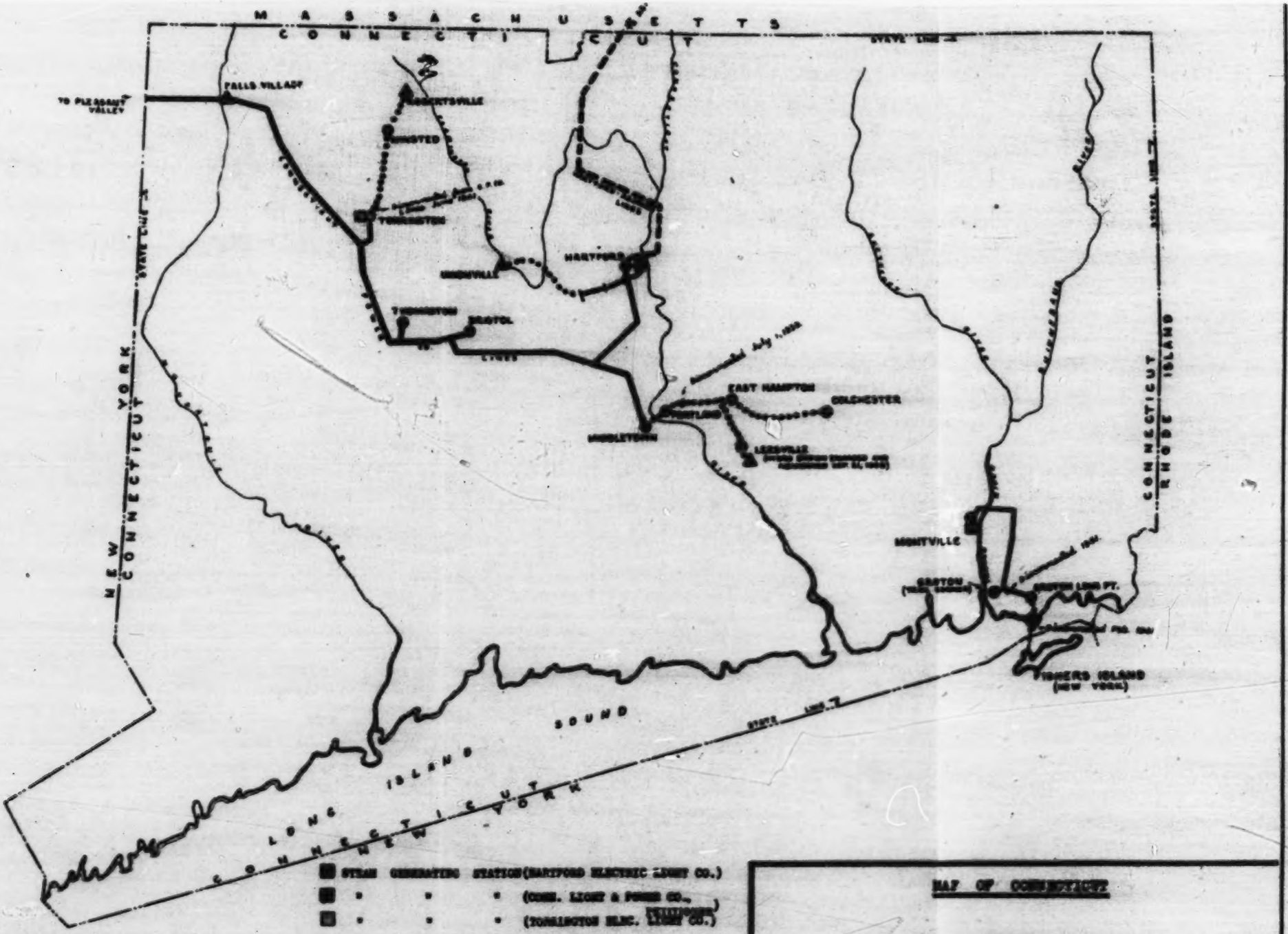
No witness other than the two Commission employees testified that watt-hour meters indicated anything other than the net flow of electric energy, because the energy which other witnesses referred to was the net energy, and not a particular component. It did not appear whether Mayott considered the possibility of counter-flow or how he computed the energy losses entailed in the transmission of energy over lines used to supply a particular load.

It is unthinkable that when Congress passed the Act in 1935, with the background of the committee reports and explanations which were given, it intended to give the Federal Power Commission jurisdiction over a utility on the basis of studies such as had never been made before, dependent upon doubtful theories which had never before been applied to such a situation, and supported only by the opinion evidence of the Commission's own employees.

When Congress in the Act referred to "interstate commerce", it could not have had in mind the establishment of interstate commerce by evidence of the character presented by the Commission engineers. To permit this is, as a practical matter, to give the Commission jurisdiction over all facilities for transmission connected as part of a system of transmission situated in more than one state. The legislative history indicates clearly that Congress deliberately decided not to do that.

In the bill as originally introduced in the Senate by Senator Wheeler (S. 1725, 74th Congress, First Session), Section 201(a) granted the Commission jurisdiction over the "production" of electric energy, over all facilities for its transmission and sale in interstate commerce, and "over all facilities connected therewith as part of a system of

power transmission situated in more than one state", with certain exceptions. After various changes, the House deleted the phrase "and over all facilities connected therewith as parts of a system of power transmission situated in more than one state", and in the bill as finally passed those words were omitted.



STEAM GENERATING STATION (HARTFORD ELECTRIC LIGHT CO.)
" " " (CONN. LIGHT & POWER CO., PETITIONER)
" " " (TORRINGTON ELEC. LIGHT CO.)
HYDRO " " (CONN. POWER CO.)
" " " (CONN. LIGHT & POWER CO., PETITIONER)
SUBSTATION (CONN. POWER CO.)
" (CONN. LIGHT & POWER CO.)
" (TORRINGTON ELEC. LIGHT CO.)
" (MUNI. OF NORTON)
" (CONN. LIGHT & POWER CO.
" (MUNI. OF NORTON)

HARTFORD-ASHAWAY 66000 VOLT LINE (CONN. POWER CO.)
OTHER 66000 VOLT LINES (CONN. POWER CO.)
33000 VOLT LINE (CONN. LIGHT & POWER CO.)
LESS THAN 33000 VOLT (CONN. POWER CO.)
" " 33000 VOLT (CONN. LIGHT & POWER CO.)
" " 33000 VOLT (HARTFORD ELECTRIC LIGHT CO.)
" " 33000 VOLT SUBMARINE CABLE (PIONEER ISLAND CO.)
" " 23000 VOLT (MUNI. OF NORTON)

MAP OF CONNECTICUT

SHOWING

CONNECTIONS OF THE CONNECTICUT LIGHT AND POWER COMPANY WITH OTHER SYSTEMS INVOVED IN FINDINGS OF THE FEDERAL POWER COMMISSION, AS THE CONNECTIONS EXISTED FROM JANUARY 1, 1937 UNTIL DATES INDICATED THEREON.

FILE COPY

JAN 3 1945
CHARLES ELMORE CROPLEY
CLERK

In the

Supreme Court of the United States.

OCTOBER TERM, 1944.

No. 189.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

REPLY BRIEF FOR PETITIONER.

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JANUARY, 1945.

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THE CONNECTICUT LIGHT AND POWER COMPANY,
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Respondent.

REPLY BRIEF FOR PETITIONER.

The brief for the Respondent, Federal Power Commission, requires, we submit, no change in any position taken in our brief filed for Petitioner. We regard most of Respondent's contentions as in effect answered or rendered immaterial by what has been said in our brief.

Certain contentions of Respondent, however, call for further comment. We will discuss these, following in general the arrangement of material under the specific headings in the argument in Respondent's brief.

PRELIMINARY STATEMENT.

At the outset Respondent's brief indicates that judicial review is limited to ascertaining whether the determination of the Commission has "warrant in the record and a reasonable basis in law".

The discussion of this contention in Respondent's brief

requires some clarification. It should be borne in mind that Respondent's principal contentions are all questions of statutory interpretation which are now arising for the first time in judicial proceedings.

As the Court said in *National Labor Relations Board* v. *Hearst Publications, Inc.*, 322 U.S. 111, 130-131:

> "Undoubtedly questions of statutory interpretation, especially when arising in the first instance in judicial proceedings, are for the courts to resolve, giving appropriate weight to the judgment of those whose special duty is to administer the questioned statute."

The Federal Power Commission, like the Tariff Commission and the Interstate Commerce Commission (which were involved in the cases cited after the language just quoted), is charged, in the matters here involved, with functions quite unlike those of the National Labor Relations Board in proceedings to enjoin unfair labor practices. The construction of the Federal Power Act here, unlike the determination of the question as to who are employees (which was involved in the case just cited), goes to the basis not merely of the jurisdiction of the Commission as an administrative agency, but also to the jurisdiction of the national government within our federal system.

It is significant that in somewhat similar cases which have arisen under the Federal Power Act the Courts have themselves construed the statute, and there is nothing in the language of the opinions which indicates that any particular weight was given to the view of the Commission as to the construction of the statute. See *Jersey Central Power and Light Co.* v. *Federal Power Commission*, 319 U.S. 61; *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. 2d 953 (C.C.A. 2d); and also the opinion of the Court below in the case at bar. (R. 1170)

If the provisions for review of the Federal Power Act were administered in the manner suggested in Respondent's brief, they would be of little benefit to one questioning any decision of the Commission. Where, as here, the question is one between the Commission itself and a party, it would be particularly inappropriate and unjust if the Commission's determination of questions of law in favor of its own jurisdiction in the specific case before it were regarded as conclusive unless lacking any reasonable basis. There is nothing in the Act indicating any intent on the part of Congress thus to deprive the Federal Courts of their historic judicial prerogatives and duties.*

I.

DISCUSSION OF RESPONDENT'S CONTENTIONS UNDER THE HEADING "PETITIONER IS A 'PUBLIC UTILITY' WITHIN THE MEANING OF THE FEDERAL POWER ACT".

Respondent's brief, under this heading, refers to the Commission's conclusions that "'electric energy generated in Massachusetts was supplied' to petitioner's Bristol 'facilities regularly, frequently, for substantial periods of time, and in substantial amounts', and that certain designated facilities at petitioner's Bristol substation are

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* One of the conclusions of the Commission which the Respondent argues is entitled to great weight is its conclusion relating to facilities "used in local distribution". A basis which Respondent's brief asserts the Commission had for its conclusions in this matter is the opinion evidence of one of its engineers who was called as a witness. (Brief, pp. 19-20, 24-25) When he was asked as to the meaning of the terms "transmission" and "local distribution", objection was made by Petitioner's counsel. The Trial Examiner, however, said (R. 498):

> "I think this clearly shows that it is not intended as an interpretation of the Act. . . . For that reason, and with the understanding that this is taken only in that narrower sense the witness will be permitted to answer."

Now, however, the Commission is taking the position that the basis for its conclusion is this very testimony of this witness.

'facilities for the transmission of electric energy in interstate commerce', as distinguished from 'facilities for local distribution', and hence are subject to the jurisdiction of the Commission."

The brief then asserts,

> "We submit that these findings were properly sustained by the court below, since they have warrant in the record and a reasonable basis in law."

This gives an erroneous impression of what the Court below decided. Its opinion says (R. 1170):

> ". . . the sole question before us is whether the finding of the Commission to that effect [Petitioner is a public utility under the Act] is sustained by substantial evidence and by a correct interpretation of the law."

It concludes (R. 1178):

> "The finding of the Commission that petitioner is a public utility is amply supported by the evidence."

The opinion of the Court is, however, vague as to just what, if any, specific findings of fact it sustains.

There is no discussion as to the meaning of the words "facilities for transmission of electric energy in interstate commerce", although the opinion does state that "the Federal Power Act made the test of jurisdiction depend, not on the current definition of 'interstate commerce', but on the actual transmission of electric energy from one State to another without regard to the mechanical means of that transmission". (R. 1176) And the opinion appears to conclude that jurisdiction extends over all of the facilities of Petitioner, even those adjacent to the premises of the consumer. (See R. 1173-1175)

Certainly the opinion does not sustain the conclusions of the Commission that certain facilities of Petitioner were not "facilities used in local distribution". The Court construes the Act as not withholding from the jurisdiction of

the Commission facilities used in local distribution, and says (R. 1175):

> "Therefore, whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as 'local' is not relevant to this case. The sole test of jurisdiction of the Commission over accounts is whether these facilities, 'local' or otherwise, are used for the transmission of electric energy from a point in one State to a point in another."

This view seems to be essentially different from that now taken in Respondent's brief, as we point out later.

A. The Evidentiary Basis of the Finding.

We deem it unnecessary to discuss further the question as to the duty of the Court below to weigh the evidence as to the presence of energy generated in Massachusetts on the facilities of Petitioner. This matter is discussed in our original brief, pp. 50-51 and 68-79. The cases there cited do not appear to have been overruled and should, we submit, be followed. In our original brief (except on the pages just mentioned) and in the remainder of this brief we assume for the sake of argument that electric energy from Massachusetts actually passes through facilities of Petitioner at Bristol.

The question as to whether the facilities at Bristol and elsewhere are facilities "used in local distribution" within the meaning of the Act depends primarily upon the construction of the statute. The conclusion of the Commission that certain of Petitioner's facilities were facilities "used for the transmission of electric energy . . . as distinguished from local distribution thereof" is based upon an interpretation of Sec. 201, which we contend is erroneous and is at war with the fundamental purposes of the Federal Power Act. (See pp. 44-47 of our brief.) All of the facilities were part of Petitioner's distribution system.

They would not have been required had Petitioner not distributed electric energy locally in the districts in which they were situated.

A discussion of their nature and functions is contained in the appendix, pp. 16–32, *infra*.

B. Discussion of Respondent's Contention that "The Finding Has a Reasonable Basis in Law".

It is somewhat difficult to determine exactly what the Respondent now contends is the meaning of the clause, "facilities for transmission of electric energy in interstate commerce", and the so-called "but" clause in Sec. 201, which mentions facilities "used in local distribution".

Apparently it construes the first of these clauses as including all facilities up to the point where the function of conveyance in bulk over a distance is completed and the process of subdividing the energy for local consumers is begun. (p. 15 of Respondent's brief) It contends that no decision of this Court has established a point at which "interstate transmission" ends, and seems to find nothing in the Act which clarifies the matter. It does not appear to follow the construction adopted by the Court below, which apparently includes in interstate transmission facilities all "kinds of equipment over which the energy flows in its instantaneous passage from a generator in one state to a consumer in another." (R. 1176) Instead, Respondent adopts the test laid down by one of its own engineers, who formulated a definition which first appears in his testimony in this case and disregarded the classification already made by the Commission for accounting purposes.*

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* Compare his testimony copied on pp. 16–17, *infra*, with the following from paragraph 16, p. 62, of Federal Power Commission Uniform System of Accounts, effective January 1, 1937:

"Stations which change the energy from transmission to distribution voltage shall be classified as distribution stations."

The definition of "transmission" and "distribution" as applied to facilities by this engineer can be judged from the following excerpts from his testimony (R. 499-500):

> "The transmission of energy in a utility system is the conveying of the energy in bulk from a point at which it is available to a point at which it is needed. Its significance is transportation or conveyance.
> "Distribution of energy in a utility system is a subdividing [1623] of the bulk energy delivered to a neighborhood, among the various consumers. Local distribution narrows the operation down to a group of consumers so closely associated as to use common distribution facilities without the necessity of considering the element of transmission between members of the group.
>
> . . .
>
> "In cases where both functions are served by the same facilities, it is considered that a facility is a transmission facility, as long as a material part of its utility as measured by the requirements of design depends upon transmission of energy where distance is an obstacle."

The electric system in every town or village, however small, has lines carrying energy at voltages higher than the voltage used by the consumers. They convey "energy in bulk from a point at which it is available to a point at which it is needed," i.e., to what this engineer calls a "neighborhood". Under his test, it is obvious that no electric system could exist without facilities which he would characterize as "transmission facilities" as distinguished from "distribution facilities".

But the brief of the Respondent says, "the Commission neither purports nor intends to assume jurisdiction under

§201(b) over the facilities of all local distributing companies".* (Footnote 2, p. 28)

This statement is difficult to reconcile with the test adopted by the Commission in its opinion. (R. 75)

We submit that the correct test is to be found in the cases, the statute, and its legislative history. In a situation such as that here presented, interstate movement extends no further than the point of delivery to the distributing company. Moreover, all facilities beyond that point are facilities used in local distribution. (See our original brief, especially p. 34)

In regard to the construction of the so-called "but" clause, which mentions facilities "used in local distribution", Respondent's brief says (p. 30):

> "Analysis of the statute and its legislative history reveals, however, that the 'but clause' was inserted out of an abundance of legislative caution in order to emphasize that while ownership or operation of the facilities described therein does not make a person a 'public utility' under the Act, the Commission's regulatory authority specifically granted in other sections of the Act extends to facilities named in the 'but clause' when owned by a 'public utility.' The 'but clause' and the preceding grant of jurisdiction over 'all facilities' for interstate transmission, when read together, are complementary and do not create overlapping categories. The 'but clause' clarifies but does not limit the scope of the preceding 'all facilities' clause."

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* The assertion in the Respondent's brief (footnote 30, pp. 27-28) that it is unusual for local distributing companies to own the step-down substations at which energy at high voltage is delivered appears to be incorrect. It is noteworthy that the brief filed in

Later the brief states (footnote p. 23):

"Since the Bristol facilities take out-of-state energy, they clearly cannot be intrastate transmission facilities within the meaning of the Act. Moreover, contrary to the contention of the State of Connecticut, failure to hold petitioner's Bristol facilities to be used 'only for transmission of electric energy in intrastate commerce' will not mean that the Commission will then have jurisdiction over all petitioner's facilities up to the consumers' appliances, for the Commission admits that ownership of facilities used *only* in local distribu-

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behalf of the National Association of Railroad and Utilities Commissioners in support of our petition for certiorari indicates that the contrary is true. (See p. 23) An investigation of a large number of companies made at our request indicates that the vast majority of such stations are owned by the local distributing companies. A great inconvenience would be caused if when repairs were needed in such a station repairmen had to be obtained from the transmitting company. They might, and probably would, have to come from a distance. The local company is in a much better position to know its needs, to design such a station, and to keep it in repair. It is worthy of mention that the substation at Bristol was designed by an engineer of Petitioner to take care of the changing situation there.

Petitioner knows of ten substations in Connecticut at which a distributing company receives energy at high voltage from its vendor. Nine of these substations are owned by the local distributing company and only one by the vendor. Inquiries made of companies outside of Connecticut also indicate that a large majority of distributing companies which purchase their energy own the substations at or near which it is delivered.

Consequently, even if the Commission's test of its jurisdiction were dependent upon the ownership of such substations, it would have jurisdiction over a vast majority of local distributing companies which purchase electric energy some part of which is generated in another State. But, as we have pointed out, the test which the Commission has adopted would give it jurisdiction over many lines between such substations and the ultimate consumer, regardless of the ownership of the substation.

> tion of out-of-state energy are excluded from its jurisdiction under Section 201(b) of the Act."

These statements are confusing.

They seem to disregard the testimony of the Commission's engineer upon which it relied. He testified (R. 499):

> "A complication enters, in that certain of the structures in the system serve both functions ["transmission" and "distribution"] at the same time, in varying degrees."

It is evidently to avoid this confusion that the Commission now confines its disclaimer of jurisdiction to those facilities which are "used *only* in local distribution of out-of-state energy". The Commission supplies this word "only"—it does not appear in the Act with the words "used in local distribution". The absence of this word "*only*" here is particularly significant in view of the fact that the words "over facilities used in local distribution" are followed by the following words—

> "or *only* for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed *wholly* by the transmitter." (Italics ours)

The words of the statute indicate that if facilities have a use in local distribution, even though they are also in some sense used in transmission, they are withheld from the jurisdiction of the Commission. Under the circumstances the applicable principle is that the Federal sphere of jurisdiction is to be carefully limited. (See cases cited on p. 31 of our brief)

We submit that the conclusion as to the meaning of the "but" clause reached in Respondent's brief is not sustained by the legislative history to which it refers. The

reports of Committees and the changes in the bill show clearly that Congress did not intend to regulate purely local companies, and that it did intend to exclude from the general jurisdiction of the Commission facilities used in local distribution. (For discussion of the legislative history on this particular point, see brief filed in behalf of the Connecticut Public Utilities Commission and the National Association of Railroad and Utilities Commissioners as *amici curiae* in support of the petition for certiorari on August 23, 1944, pp. 15-21, and pp. 39-41 of our brief.)

II.

DISCUSSION OF RESPONDENT'S CONTENTION THAT "REGARDLESS OF PETITIONER'S PRESENT STATUS, IT WAS A 'PUBLIC UTILITY' WHILE THE COMMISSION'S ACCOUNTING ORDERS WERE IN EFFECT, AND IT REMAINS UNDER A DUTY TO COMPLY WITH SUCH ORDERS FOR THE PERIOD IN WHICH IT WAS SUBJECT TO THE COMMISSION'S JURISDICTION."

Respondent contends that, apart from the Bristol facilities, Petitioner was a public utility at various times on account of facilities at East Hampton, Winsted and the Groton district.

Further discussion as to whether Petitioner was subject to the Commission's jurisdiction because of any of these facilities seems unnecessary. For the reasons stated in our original brief we contend that it was not.

We reiterate our contention that even if Petitioner was a public utility, no useful purpose would now be served by requiring it to comply with the accounting orders of the Respondent.

Respondent's brief appears to admit that if a company discontinues the operation of facilities which made it a "public utility" within the meaning of the Act, it ceases to be such under the Act. (Brief, p. 42) It is also clear that the Commission never had authority to regulate any

of Petitioner's rates or issuance of securities. (See Respondent's brief, p. 45)

Respondent contends, however, that the compilation of accounts for past years in accordance with the rules of the Federal Power Commission would serve a useful purpose. But the Connecticut Commission has during all of those years required detailed accounting, and it has issued orders for the furnishing of such cost studies as it desires.*

In support of its argument under this point, Respondent's brief states that during the debates in the House it appeared that there were alleged write-ups aggregating $21,000,000 in accounts of Petitioner and two companies since merged in the Petitioner. (p. 43 of brief; see also footnote 14, p. 7)

We fail to see how any such statement can have any bearing on any issue in this case. Inasmuch as Respondent's brief has twice repeated this charge, however, it seems only proper for us to state the facts.

There is no evidence in the record in this case supporting this statement.

The major part of the item referred to is alleged to have been on the books of the Northern Connecticut Power Company or on the books of the Connecticut Electric Service Company. Whatever those companies may have done, it is certain that no part of those items came to the books of Petitioner when those companies were merged in it in 1935. The items in question are not now and never have been on the books of the Petitioner.

The remaining part of the item referred to is highly questionable. The examiner for the Federal Trade Com-

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* See finding and orders in Connecticut Public Utilities Commission, Docket Nos. 6861 and 6861A.

mission, in his report in referring to Petitioner, made no reference to a "write-up". In this connection he made the following statement:

> "Excess cost to the Connecticut Light & Power Company while, in fact, indeterminable, may on one basis be said to have been a negative amount of $741,911.21. On another basis probably as accurate as the first basis, such costs may have been in excess of prior costs by $925,488.79."

(See report of Federal Trade Commission, Vol. 54, pp. 806-807, Senate Document 92, 70th Congress; 79 Cong. Rec., Part 10, p. 10422.)

It is Petitioner's belief that the cost to it which appears on its books was less than the original cost.

The Commission in its opinion has cast slurs upon Petitioner and has endeavored to create the impression that it has been sly and overreaching.* We submit that such contentions have no place in a proceeding of this character and we would disregard them were they not now repeated in Respondent's brief. As they are without foundation, it seems proper to dissipate them even though they are immaterial.

The facts even as set forth in the opinion show how absurd these charges are.

As appears from the Order to Show Cause itself, Petitioner from the start declined to comply with numerous orders of the Commission applicable to public utilities. (R. 50-51)

---

*The brief of the Commission also blames Petitioner for delays in having the matter determined. Most of the delay is due to the Commission itself. The provisions of the Act under which the Commission claims jurisdiction took effect in August, 1935. An order to show cause in this matter was not issued until 1941. (R. 48) The hearings were concluded in October, 1941. The opinion of the Commission was not handed down until May, 1942. (R. 83)

At no time did Petitioner in any way mislead the Commission as to the nature of its business or its connections. It is true that it has at all times been the policy of Petitioner, as its president stated at the first day of the hearing, to try to avoid situations which might in the view of the Commission subject it to the Commission's jurisdiction. (R. 145, 361-362) But as the Court said in *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. 2d 953, 960:

> ". . . to make such an attempt [i.e., to take steps to escape the Commission's jurisdiction] is not unlawful, is indeed not immoral . . ."

It should be borne in mind that the accounts of Petitioner are subject to supervision and inspection by the Public Utilities Commission of the State of Connecticut. All of the transactions and all of the facilities of the Petitioner are subject to the jurisdiction of the Public Utilities Commission of Connecticut.

III.

CONCLUSION.

Clearly, none of the sales of Petitioner nor any of its activities for which it received compensation are subject to the jurisdiction of the Federal Power Commission nor have they been subject to its jurisdiction at any time. The claim of jurisdiction is based solely upon the fact that until 1941 about 1/5 of 1% of the electric energy dealt in by Petitioner went outside of the State to a customer of a customer of Petitioner, and that for three comparatively small communities which Petitioner served at retail it bought energy from the Connecticut Power Company, some of which, engineers of the Commission assert, was generated in Massachusetts, although Petitioner's contracts called for no such energy. Only one of these communities

is now connected with the lines of the Connecticut Power Company.

We submit that Congress never intended to submit a company such as Petitioner to the jurisdiction of the Federal Power Commission and that the order under review should be reversed.

Respectfully submitted,

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January, 1945.

APPENDIX

DISCUSSION OF THE NATURE AND FUNCTION OF PETITIONER'S FACILITIES IN ITS BRISTOL, EAST HAMPTON, AND TORRINGTON-WINSTED DISTRICTS WHICH WERE HELD BY THE COMMISSION TO BE FACILITIES "FOR THE TRANSMISSION OF ELECTRIC ENERGY . . . AS DISTINGUISHED FROM LOCAL DISTRIBUTION THEREOF."

The only witness who testified that any of the facilities of Petitioner in any of these places were facilities which were used for transmission, as distinguished from generation or local distribution, was Mr. Thomas, Engineer, who is Regional Director of the 2nd Administrative District of the Federal Power Commission, with headquarters at Atlanta. He testified in part as follows (R. 499-500):

> ". . . the terms 'transmission' and 'distribution' in electric utility systems, like other broad terms, may be used in a number of different relations and for different purposes, so that no single definition can be drawn for either term that will be consistent and useful in all cases.
>
> . . . . .
>
> "A complication enters, in that certain of the structures in the system serve both functions at the same time, in varying degrees.
>
> "With this explanation, I will define the terms 'transmission' and 'distribution,' in their functional sense, as outlined above in my answer.
>
> "The transmission of energy in a utility system is the conveying of the energy in bulk from a point at which it is available to a point at which it is needed. Its significance is transportation or conveyance.
>
> "Distribution of energy in a utility syste-n is a subdividing of the bulk energy delivered to a neighborhood, among the various consumers. Local distribution narrows the operation down to a group of con-

sumers so closely associated as to use common distribution facilities without the necessity of considering the element of transmission between members of the group.

"Transmission facilities are characterized by the search for low energy losses and economy of structural costs; local distribution by the convenience of customers and of the public and the general necessity of accommodation to many structural limitations due to the use of public rights of way, private yards, esthetic considerations, and so forth.

"In cases where both functions are served by the same facilities, it is considered that a facility is a transmission facility, as long as a material part of its utility as measured by the requirements of design depends upon transmission of energy where distance is an obstacle."

(R. 501):

"Applying these definitions of distribution, it will be found that no two utility systems are alike and a certain flexibility must exist in the definition of the term 'distribution'.

"*Q.* Will you please explain what you mean by certain facilities serving a transmission or a local distribution function?

"*A.* By the term 'function,' I have in mind the objective or plan of the designer of the line who must consider what purposes he wishes to accomplish, and what means he has at his disposal. *In this functional analysis of facilities, the actual purpose of the design will guide as between transmission and distribution.*" [Italics ours.]

It is obvious that any facility in an electric system

through which electric energy flows is used for transmission, and any attempt to classify a particular facility as one for transmission or one for local distribution must depend to considerable extent upon the emphasis which one wishes to place upon its functions.

There is no evidence that any of the facilities of Petitioner in any of these three areas was designed with a view to receiving energy from Massachusetts or to the transmission of energy from the distance which that would entail. Mr. Thomas admitted that he did not mean to say that any of the facilities was specifically designed to receive Massachusetts energy. He knew nothing about their history nor why they were laid out, and he was unable to state any particular in which they were peculiarly fitted for receipt of energy from that distance. (R. 632-636)

Insofar as Mr. Thomas intended to indicate that any of the facilities which he mentioned were used neither for local distribution nor for generation, his conclusions are not those which should be reached for purposes of determining jurisdiction of the Federal Power Commission. His testimony in this matter was received as evidence of classification only in the "narrow sense" as to how the terms were "used and applied by persons particularly engaged or interested in the design, construction, operation or maintenance of electric utility systems". (R. 497-498)

When counsel for Petitioner objected to questions asked of this witness on the ground the witness was in fact interpreting the Act, the trial examiner said (R. 498):

> "I think this clearly shows that it is not intended as an interpretation of the Act. . . . For that reason, and with the understanding that this is taken only in that narrower sense, the witness will be permitted to answer."

Now, however, the Commission is taking the position

that the basis for its conclusion is this very testimony of this witness.

Mr. Thomas made the following significant statement (R. 500):

> "In cases where both functions are served by the same facilities, it is considered that a facility is a transmission facility, as long as a material part of its utility as measured by the requirements of design depends upon transmission of energy where distance is an obstacle."

This statement indicates that such testimony of Mr. Thomas as was directed toward specific facilities owned by Petitioner has no bearing upon the question of whether those facilities are "used in local distribution," since that testimony apparently is based upon the premise that these facilities must be placed in only one of two categories, regardless of the fact that they might properly be said to belong in both categories. That premise, however, has no relation to the criteria of jurisdiction contained in the Federal Power Act, for, as we have shown, the test is not whether certain facilities should be classified as transmission or distribution facilities. The test is a much simpler one—namely, whether they are "used in local distribution."

Consequently nothing that Mr. Thomas said with reference to any specific apparatus of Petitioner has any probative value. It is not directed to any matter in issue. There remain only his general statements as to what in his opinion as an engineer is meant by the words "distribution" and "transmission".

We submit that for two additional reasons Mr. Thomas' testimony is not helpful: because it appears that actually the purpose of design of some of the facilities in question was primarily for local distribution; and because the clas-

sification which he made was very different from that made by the other engineers who testified in regard to this, *i.e.*, Professor Lewis and Professor Scott. No other witness supported Mr. Thomas in the classification of the facilities in question. It is important, then, to see what the other witnesses said in regard to this matter.

The following are extracts from the testimony of Dr. Lewis (R. 886-888):

> "As I see it, every circuit of any physical length must consider in its broadest sense some element of transmission, because clearly, if the load is to be supplied, the energy must be transmitted from points nearer to the source, to points nearer to the load, and ultimately to the load itself, and no circuit can ignore entirely this concept. Even circuits within a private house must consider the element of transmission, in the sense that the size of the conductor must sometimes be increased in order to reduce the voltage drop in the line, even though such a conductor size is not essential to carry the current without injurious heating.
>
> "I would therefore qualify 'local distribution' somewhat as follows: Local distribution narrows the operation to a group of customers located in contiguous territory, and involving those circuits and pieces of equipment which may or are designed to serve several customers."
>
> . . . . . .
>
> "By Mr. Branch: And again, in speaking of the functions of transmission and distribution, Mr. Thomas, on page 1303 said:
>
> " 'In cases where both functions are served by the same facilities, it is considered that a facility is a transmission facility as long as a material part of its utility as measured by the requirements of design de-

pends upon transmission of energy where distance is an obstacle.'

"Do you agree with that statement of Mr. Thomas? *A.* I would not personally agree with it if Mr. Thomas means to imply that a facility for which a material part of its utility depends upon transmission is classified as a transmission facility to the exclusion of the possibility that it may also be classified as a distribution facility, if any material part of its function is directly associated with distribution. To me, there is no clear line of demarcation between transmission and distribution, and certain facilities might easily be classified as transmission by one engineer, and distribution by another, and I would be unwilling to ascribe to a definition which insists that all facilities are transmission exclusively, if they have any transmission function in the functional sense of the word.

"*Q.* All right. Do you believe it possible to draw a complete distinction then between the terms 'transmission' and 'distribution' or 'transmission' and 'local distribution'? *A.* In my opinion, these terms overlap to a greater or less degree. I therefore believe that any sharp distinction between these two terms must be arbitrary, and not of a purely engineering character. It seems to me that this question in many cases depends upon the function the designer had in mind when the facility was designed and built, and it is not possible for someone else to assign a hard and fast function either as transmission or distribution."

The following are extracts from the testimony of Professor Charles F. Scott (R. 982-985):

"*Q.* Is there any clearly defined line of demarcation in the generally accepted use of these terms, be-

tween 'transmission' on the one hand, and 'local distribution,' on the other? *A.* The distinction is rather one of function than of definite quantities. There is, for example, no particular distance or no particular voltage or amount of power which may be distinguished one from the other. What in one place and under certain circumstances might be properly considered as transmission may, under other circumstances, employ greater power or greater distance, or greater voltage in what is termed a distribution system."

. . . . . .

". . . A valid classification, therefore, must contemplate everything between the generator and the ultimate consumer. Of course, all circuits actually transmit power, but the term 'transmission,' from the engineering viewpoint, is primarily associated with the source of power, whereas 'distribution' is primarily associated with the destination and employment of electric power."

. . . . . .

"*Q.* Will you continue? *A.* Ordinarily, therefore, since transmission logically ceases where the wholesale delivery of power occurs, and the further facilities have close relation to the delivery of power to the retail customer, the classification of an actual system into two divisions should be made at that point, so that the substation and circuits emanating from it would be included within the term 'distribution'.

"*Q.* I am going to read to you a quotation from the testimony of Mr. Thomas, it being a statement which he made in making a distinction between the terms 'distribution' and 'local distribution.' This is the statement:

" 'Distribution of energy in a utility system is a

subdividing of the bulk energy delivered to the neighborhood among the various customers. Local distribution narrows the operation down to a group of consumers so closely associated as to use common distribution facilities without the necessity of considering the element of transmission between members of the group.' That is the end of the quotation. What have you to say in regard to the distinction indicated in that statement? *A.* I cannot agree that it is a recognized distinction. In my experience, there is no such generally accepted distinction between the terms 'local distribution' and 'distribution.' I regard the word 'local' as conveniently descriptive of distribution as contrasted with the term 'long distance,' when applied to transmission."

Professor Scott was of the opinion that all of the facilities of Petitioner which Mr. Thomas characterized as "facilities for transmission" were facilities which were used either for local distribution or generation.

Professor Scott testified that all of the facilities in Bristol owned by Petitioner were "facilities used in local distribution" and gave the following explanation (R. 985-986):

"The principal facilities in the substation at Bristol are the transformers and the synchronous condenser. These facilities seem to me to be clearly a part of the local distribution system. The transformers have been designed to supply energy at two particular voltages which are suited to the requirements of the Bristol distribution system. The transformers, as I understood, were specified by the engineer of the Connecticut Light and Power Company to meet the particular conditions and requirements of this distribution system. This, to my mind, makes their design,

installation, and operation for the specific purposes, and to meet the specific requirements of a distribution system. Certain apparatus, including the lightning arrestors and the switches are for the protection and operation of the transformers, and are therefore simply auxiliary to them. The synchronous condenser performs two functions directly related to the distribution system. The first of these is the maintenance of a steady voltage on the distribution system; the second function of the synchronous condenser may be illustrated as follows: Induction motors require for their operation two kinds of current. One is a magnetizing current required when the motor is loaded, and also when it is running empty. The other is the power current which varies in proportion to the power delivered by the motor. The synchronous condenser produces the magnetizing current which is necessary to the proper operation of the distribution system, and therefore is an element in the local distribution system. Thus, the transmission properly ends with the termination of the Connecticut Power Company's line."

And he testified (R. 987, 989):

"At the substation in Middletown, the 66,000 volt circuit terminated, and the energy was transformed to about 4,000 volts and 13,000 volts. From that substation several circuits emanated, from one of which customers in Middletown were served. Furthermore, from the substation in Portland, various circuits supplied factories at about 13,000 volts and commercial and domestic consumers at about 4,000 volts. The circuit which ran from the substation in Portland to Pole No. 110, a distance of nearly a half mile, was tapped to serve residential customers. Thus it appears that

even before the energy had reached Pole No. 110 at which the facilities of The Connecticut Light and Power Company began, it had been transformed into two different voltages and supplied over various circuits to many customers of different types and different locations. From Pole 110, where the energy was metered, the energy went to two substations of The Connecticut Light and Power Company at about 13,000 volts. One of these was the Collins Hill substation and the other the West High substation, both of which customers of the company were served; from the West High substation circuits operating at about 13,000 volts went to various substations from which customers were supplied, including the Leesville substation and those at Comstock Bridge, Westchester and Colchester. Looking at the matter as it is regarded in the industry, some of the points I note are as follows: Clearly the main purpose of this line was to make energy available to many customers in scattered groups. The system is in the country. Its function is distribution to ultimate consumers; since it is in the country we naturally expect that the distances between customers will be greater than in an urban area. These distances between customers do not alter the characteristics, which are distribution. I notice that the voltages, about 13,000 volts and 2,300 volts, are characteristic of distribution. In a thickly settled city, where voltages are used for distribution, these values are found. We have here a system which is like the distribution in the City, except that it is spread out. In general, moreover, the lines have the characteristic of ordinary distribution lines.

"*Q.* Professor Scott, you have talked about the lines and have expressed your opinion generally about the facilities. Would your characterization of the fa-

cilities in this area, as facilities used in local distribution, include the substations which you have mentioned, belonging to The Connecticut Light and Power Company with the transformers and other incidental apparatus? *A.* Yes. I regard the system including these substations and the lines to them and the lines from them, as being devised and planned from the standpoint of reaching the customer, and from the general classification which I gave when it is the needs of the customer and the circuit for supplying those particular needs, I class that as primarily distribution."

. . . . . .

(R. 991-993):

"*Q.* Very well. In your opinion as an engineer, are the facilities of the Connecticut Light and Power Company in the Winsted-Torrington district, facilities for transmission or facilities used in local distribution, based on your explanation of these terms?

. . . . . .

". . . *A.* I should classify all the facilities of the Connecticut Light and Power Company in this district as facilities for local distribution, except the facilities of the Robertsville plant, which I would call facilities for generation. Most of what I have said—

"*Q.* Will you explain? *A.* Most of what I have said about Middletown is applicable here. The facts regarding voltage and distance, while they should be considered, are not determinative, for, as I have said before, the test is not a quantitative one. The principal point of difference is the stepped-up line, stepped-up in voltage, which runs to Winsted. The characteristics of this line differ from those usually associated with transmission facilities. Transmission

lines are characteristically, though not always, carried on high steel towers, and are not found along city streets or highways, whereas the Torrington-Winsted line is carried on wooden poles, and for at least a part of the way along city streets and highways in the manner usually associated with lines for local distribution. Higher voltage that the Torrington system is employed merely for engineering reasons. Formerly it served several customers, as I understand, and in this it was clearly fulfilling a function of distribution. Reduction in the number of customers served does not justify a change of classification from distribution to transmission, where substantially the same construction is used and the function and general characteristics remain the same. Taking a comprehensive view of the system, distribution began at Torrington, where the transmission of the Connecticut Power Company delivered power to the Torrington Electric Light Company."

Professor Lewis did not go into the matter of particular facilities in great detail, and was asked only about facilities at Bristol. He was of the opinion that these facilities performed distribution functions and specifically that the synchronous condenser would serve "a distinctly distributional function if it is found that the power factor of the load in Bristol is relatively low and that it is desired to improve the power factor, in order to minimize the voltage drop in the transformers, and control the voltage at substations in order to produce more nearly consistent voltage on customers' lines" (R. 2359-2360).

As to the function and use of facilities in the substation at Bristol, the testimony of Calvin T. Hughes is of peculiar weight as he designed the substation.

He testified as follows in regard to this matter (R. 841-842):

"*Q.* At the time of the installation and design of those facilities at Bristol substation, what, if any, other facilities were installed or designed? *A.* There were other facilities installed in connection with design and construction of the substation. All circuits, that is, the 13,800 volt, the 4800 volt circuits, which originated in the substation, were revamped, reconstructed, and the voltage changed, and additional circuits added. Or, in other words, a complete system was worked out for supplying the territory.

"*Q.* You have stated that you supervised the design and construction of these facilities of the Connecticut Light and Power Company. Did you at that time have any objective or plan which you wished to accomplish? *A.* Yes.

"*Q.* Will you state what this objective or plan was? *A.* The company had purchased the Bristol property about 1926. Due to increased loads in the district, it became evident very shortly that the existing facilities were inadequate to provide proper service, and I was assigned the task of designing a complete distribution system to replace the inadequate ones, this to include all necessary facilities from the point of receiving the power to the ultimate delivery to customers. This study early indicated that it would be economical to utilize two voltages. Hence, the transformers were purchased with three windings, namely 66,000 volts, 13,800 volts and 4800 volts. The 13,800 volts would be used to supply the larger industrial loads, and the 4800 volts to supply the residential and some commercial loads. The smaller amount of load in the center of the city was retained at the prior voltage of 2300 volts. The plans had not progressed very

far before it was realized that the heavy industrial loads had a low power factor, that is, required a considerable excitation current. So it was decided to install a 10,000 k.v.a. synchronous condenser and connect it to the 13,800 volt bus which supplied the larger part of the industrial load. The location of the present outdoor bus structure, transformers, and appurtenances, was determined by the following factors: First, it was necessary to maintain service throughout the construction period over the then existing facilities. Second, at that time there was a steam heating plant which occupied the space immediately south of the present brick building which houses the indoor substation. Therefore, the present location was adopted.

"*Q.* Is there anything in the design or structure of the facilities which you have described which were adopted, or which were uniquely adopted to receive energy from out of the State? *A.* No.

"*Q.* Bearing in mind, if you will, your objective or plan, will you state the functions performed by the various facilities of the company in Bristol, those facilities which you of course have described? *A.* All the facilities are used for the purpose of distributing locally the power received from the Connecticut Power Company to the customers of the Connecticut Light and Power Company."

. . . . . .

(R. 843):

"*Q.* Mr. Hughes, in your opinion as an engineer, bearing in mind, if you will, the explanations you have made of the functions performed by these facilities, in your opinion are these facilities used in the local distribution of electric energy?

Trial Examiner: You may answer the question.
The Witness: Yes."

(R. 938-939):

"*Q.* Mr. Hughes, is the synchronous condenser in Bristol in continual use? *A.* No.

"*Q.* Can you explain when and why it is used? *A.* The Bristol condenser is used during the periods that the industrial load is on, or, I mean by that, when the larger industrial customers are drawing considerable power. It is not on nights, Sundays, holidays, a good many Saturday afternoons, and is ordinarily during the work week started up, in the morning, about the time the factories start, or the loads start to come on, and it is shut down in the evening.

"*Q.* What relation does what is done have to the 13.8 k.v. line running out of the Bristol substation? *A.* It is always started, and our sole objective in operating the condenser, I say our sole objective, it is the major, if not its entire use, is to maintain the voltage on the 13,800 volt bus with which the 13.8 feeders are connected."

The conception of Mr. Thomas as to local distribution is so narrow that if the term, as used in the Federal Power Act, were construed to conform with his characterization, it would be largely or wholly ineffective. It is hard to conceive of any company serving a community at retail which would not have facilities for transmission as distinguished from facilities for local distribution, as those terms are used by Mr. Thomas. In specifically exempting jurisdiction "over facilities used in local distribution" Congress intended to exempt companies which did merely a local business. The three districts of Petitioner under discussion are entitled to precisely the same treatment as if

each district were served by a single separate company. Each serves only a comparatively small area and in none of them is any transmission of energy for any great distance involved.

At Bristol Petitioner's facilities, which Mr. Thomas classified as used for transmission purposes, are merely those in a substation in the heart of Bristol, covering a small area. Any transmission which occurs in these facilities extends over a distance of only a few feet. The transmission of electricity incidental to the supply at Bristol was over lines of Connecticut Power Company, including the line from Bristol Mountain to Bristol substation, a distance of about a mile. Petitioner owned none of this line. Obviously, its substation was designed merely in connection with its local business at Bristol. Congress, we submit, did not contemplate that ownership of such a substation and the facilities which it contained should subject a company to Federal jurisdiction.

The situation as to East Hampton and the Torrington-Winsted district was somewhat different owing to the fact that these two districts serve less compact areas than Bristol and the distances between customers is larger. There are considerable distances in places along the lines in which no customers are served, but we contend that Congress did not intend to submit companies to the jurisdiction of the Federal Power Commission merely because territories which they served were sparsely inhabited.

We submit that the Commission's test of classification for purposes of Section 210(b)—that adopted by Mr. Thomas—is based upon an incorrect view of the meaning of the statute. It is inconceivable that Congress intended to submit a company doing a purely local business to the jurisdiction of the Commission, because it had lines some 10 or 15 miles long used in connection with the purchase

of electric energy from another local company for distribution in the immediate area or that a company should be subjected to the jurisdiction of the Commission because it had a single piece of apparatus such as the synchronous condenser at Bristol, the use of which was occasioned by the nature of the local load.

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No. 189

In the Supreme Court of the United States

OCTOBER TERM, 1944

THE CONNECTICUT LIGHT AND POWER COMPANY, PETITIONER

v.

FEDERAL POWER COMMISSION

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE RESPONDENT IN OPPOSITION

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BRIEF FOR THE RESPONDENT IN OPPOSITION

OPINIONS BELOW

The opinion of the United States Court of Appeals for the District of Columbia (R. III, 1170)* is reported in 141 F. (2d) 14. The Federal Power Commission's findings, opinion and orders

*The record in this case consists of both printed and unprinted material. The printed record (which was made an appendix to petitioner's brief below) is in three volumes, and will be cited herein as "R. I, II or III." The unprinted record, which was also filed with the court below and has been filed with this Court, consists of the transcript of the proceedings before the Commission (cited herein as "Tr.") and the exhibits (cited as "Ex.").

(R. I, 63–85) are reported in 44 P. U. R. (NS) 170.

JURISDICTION

The judgment of the United States Court of Appeals for the District of Columbia was entered on February 28, 1944 (R. III, 1178). A petition for rehearing was denied on March 25, 1944 (R. III, 1195). The petition for a writ of certiorari was filed on June 23, 1944. The jurisdiction of this Court is invoked under Section 313 (b) of the Federal Power Act (49 Stat. 86, 16 U. S. C. 825*l*), and Section 240 (a) of the Judicial Code as amended by the Act of February 13, 1925.

QUESTION PRESENTED

Whether the Federal Power Commission was warranted in finding petitioner a "public utility" within the meaning of the Federal Power Act.

STATUTE INVOLVED

The relevant provisions of the Federal Power Act of 1935 are set forth in the Appendix, *infra*, pp. 19–23.

STATEMENT

On January 7, 1941, the Federal Power Commission issued an order (R. I, 48–52) directing petitioner to show cause "why it is not now, and has not been since August 26, 1935" (the effective date of the Federal Power Act), a "public utility" within the meaning of the Act, and why it had not complied with the Uniform System of Ac-

ecounts prescribed by the Commission for such public utilities, effective January 1, 1937, and the Commission's orders supplemental thereto (R. I, 35–36, 40–47). Following an extensive hearing, the Commission, on May 13, 1942, found (R. I, 63–82) that petitioner at all times since August 26, 1935, had been a "public utility" within the meaning of the Act, and directed petitioner to reclassify and keep its accounts in accordance with the Commission's Uniform System of Accounts (R. I, 83). A petition for rehearing (R. I, 7–33) was denied on June 23, 1942 (R. I, 84–85). On petition for review (R. I, 1–33), the court below affirmed the Commission's order (R. III, 1178).

The following facts shown by the record are undisputed:

Petitioner owns and operates an electric utility system in the State of Connecticut (R. I, 63, 86; Ex. 70). Until two days before the Federal Power Act became effective, on August 26, 1935, petitioner was a member of an interstate power pool, known as the Connecticut Valley Power Exchange[1] (R. I, 70; R. II, 296). Petitioner's

[1] The operations of this Exchange are described in *Hartford Electric Light Co. v. Federal Power Commission*, 131 F. (2d) 953 (C. C. A. 2), certiorari denied, 319 U. S. 741. In addition to The Hartford Electric Light Company and petitioner, the Exchange included Turners Falls Power and Electric Company (R. II, 294–295). The transmission facilities of The Connecticut Power Company, a non-member, were used in Exchange operations under a toll contract (R. III, 1090–1096).

main system was connected near New Britain, Connecticut, with the Hartford-Falls Village 66,000-volt double-circuit line ("C. P. 1 and C. P. 2 lines") of the Connecticut Power Company (R. III, 1113; Ex. 38; R. II, 295–297). This line interconnected at its east end, through a substation in Hartford, with the Hartford-Agawam line running northward to Massachusetts (R. I, 65; R. III, 1113; Ex. 38, R. II, 378–380, 394–396; R. III, 1119–1122),[3] and at its west end, in Falls Village, Connecticut, with a line extending to Poughkeepsie, New York (R. II, 278–279, 394; R. III, 1113, Ex. 38).[4] Over these lines, Central Hudson Gas and Electric Company and the members of the Connecticut Valley Power Exchange (including petitioner) interchanged energy among their systems in New York, Connecticut, and Massachusetts (R. I, 65–66; R. II, 276–279, 294–295).

In addition to the New Britain connection, petitioner maintained separate connections for taking energy from the C. P. 1 and C. P. 2 lines, to supply the major requirements (R. II, 397–402, 409, 473–474 of its East Hampton and Winsted districts, and the entire requirements (R. I, 68–69, 400–401) of its Bristol district. For its East Hampton

[3] Owned in Connecticut by The Connecticut Power Company and in Massachusetts by the Turners Falls Power & Electric Company (R. II, 396).

[4] Owned in Connecticut by The Connecticut Power Company and in New York by the Central Hudson Gas and Electric Company (R. II, 397).

district, petitioner's twelve mile 13,800-volt line took energy from the C. P. 1 and C. P. 2 lines (through intervening facilities of The Connecticut Power Company) at "pole 110" in Portland to petitioner's step-down substations in East Hampton, Colchester, and Leesville, Connecticut, where the voltage was reduced and the energy distributed over petitioner's lines serving those communities and adjacent areas (R. I, 66–67; R. II, 491–493, 409, 401–402, 473–474, 392–397, 231–233; Ex. 26). For its Winsted district, petitioner's facilities took energy from the C. P. 1 and C. P. 2 lines through intervening facilities of The Torrington Electric Light Company in Torrington, after the voltage had been stepped-down to 2,300 volts (R. I. 67; R. II, 394–395, 397, 399–400, 410, Exs. 27, 79, 80A). Such facilities of petitioner included a step-up substation at Torrington, a ten-mile 27,600 volt, double-circuit line, and a step-down substation at Winsted where the voltage was reduced to 4,600 volts and the energy distributed over petitioner's lines serving Winsted and environs (R. I. 68; R. II, 494; Exs. 79, 80A, 27, 60). At Bristol, petitioner's facilities included an outdoor step-down substation with transformers and appurtenant facilities (including a synchronous condenser), and lines from petitioner's substation to supply consumers in Bristol and environs (R. I, 69; R. II, 493, 519). Energy was delivered at 66,000 volts over a short tap

from the C. P. 1 and C. P. 2 lines to petitioner's substation at which the voltage was stepped-down to 4,600 and 13,800 volts (R. I, 65, 68–69; R. II, 410, 493, 519–529). The synchronous condenser was operated to maintain the "power factor" (R. I, 69, 75; R. II, 228–230; 519–520, 528–529) required by The Connecticut Power Company under its power-supply contract with petitioner (R. III, 1040).

Considerable evidence was introduced for the Commission at the hearing, showing that Massachusetts energy flowed frequently, for substantial periods and in substantial amounts, over the C. P. 1 and C. P. 2 lines, alone or in conjunction with Connecticut energy, to petitioner's facilities in its East Hampton, Winsted and Bristol districts (R. II, 388–474, 584–590, 474–543; R. III, 710–712; Exs. 61–62; R. III, 1119–1120; R. I, 279–280, 293–294).

Apart from the facilities taking energy from the C. P. 1 and C. P. 2 lines, petitioner's main system was connected in the southeastern corner of Connecticut with the facilities of the Borough of Groton, and petitioner sold energy generated at its Montville plant to the Borough which resold it in part (with petitioner's knowledge) to a company serving the entire requirements of Fishers Island, New York (R. I, 74; R. III, 640, 642–643, 737; R. II, 357, 361, 462–464). Such energy was transmitted over petitioner's 33,000-volt double-circuit line ex-

tending from its step-up substation at Montville to a substation at Groton Long Point, where the voltage was reduced to 6,900 volts and the energy conveyed to Fishers Island, New York, over facilities of the Borough and the company serving that island[5] (R. I, 64–65, 74, 77; R. III, 1141, 1049–1051; R. II, 532–542; 180–207).

Seeking, as the circumstances clearly indicate, to avoid regulation by the Federal Power Commission (R. III, 359–363, 145–148),[6] petitioner, on August 24, 1935, two days before the Act took effect, severed the connection of its lines at New Britain with the C. P. 1 and C. P. 2 lines.[7]

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[5] On the basis of these operations the company serving Fishers Island admitted its "public utility" status (R. III, 1048–1049; see Commission Opinion R. I, 78).

[6] Proponents of the Act, by way of illustrating the accounting abuses sought to be remedied by the Act, specifically cited, during the debates in the House, write-ups aggregating $21,000,000 in the accounts of petitioner and two companies (Northern Connecticut Power Company and Connecticut Electric Service Company) since merged into petitioner (Moody's Public Utilities, 1942, p. 1151; *ibid.* 1936, p. 2549). See 79 Cong. Rec. 10421–10424. The method adopted by the Commission for eliminating write-ups is illustrated by *Northwestern Electric Co.* v. *Federal Power Commission*, 321 U. S. 119.

[7] Petitioner severed this interconnection on the Saturday afternoon before the Monday on which the Act was approved by the President (R. II, 295–297). The Connecticut Power Company's lines were severed at the state boundary the next day, Sunday, August 25 (R. III, 1105–1106; R. II, 330–331). When satisfied that this had been done, petitioner reconnected at New Britain and thereafter engaged in intrastate pooling operations with The Hartford Electric Light Company (R. II, 297–299, 386). To avoid losing $100,000 a

For similar reasons petitioner, in June 1939, severed its East Hampton connection (R. I, 66, 73; R. II, 361–363; R. III, 764–765), in June 1941 discontinued taking energy for its Winsted district supplied by The Connecticut Power Company at Torrington (R. II, 145–148, 138), and in February 1941 brought about the termination of the sale of energy by the Borough of Groton to Fishers Island (R. I, 107–115; R. II, 178–179, 195–197; R. III, 1052–1053, 1145–1149). However, presumably due to contractual commitments and the difficulty of providing an alternative supply (R. II, 371),* Bristol was not disconnected and is still supplied with energy from the C. P. 1 and C. P. 2 lines (R. I, 69, 74; R. II, 369–371).

The Commission found that certain designated facilities of petitioner in its East Hampton and Winsted districts, prior to the disconnections, were "facilities for the transmission of electric

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year (R. III, 1108), the interstate Exchange resumed operations on May 29, 1936, without petitioner, which had again severed its New Britain interconnection (R. II, 300). The members of the Exchange thereafter were The Connecticut Power Company, the Turners Falls Power & Electric Company, and the New England Power Company (R. III, 1084–1085). These companies do not contest their "public utility" status (R. II, 258; *Western Massachusetts Electric Company*, F. P. C. Op. No. 85, 46 P. U. R. (NS) 215, 217; *Connecticut River Power Company, et al.*, 2 F. P. C. 539; *New England Power Company, et al.*, 2 F. P. C. 612).

* Petitioner's contract to purchase its power requirements for Bristol from The Connecticut Power Company is not terminable until January 1, 1947 (R. III, 1042).

energy in interstate commerce" (R. I, 67–68). It further found that petitioner's facilities for supplying Groton (until sales to Fishers Island were discontinued on February 28, 1941) were facilities for both the transmission of electric energy in interstate commerce and the sale of electric energy at wholesale in interstate commerce (R. I, 64–65). Finally, the Commission found that petitioner's synchronous condenser, step-down transformers and appurtenant facilities at Bristol "were and are facilities for the transmission of electric energy in interstate commerce" (R. I, 69). Upon the basis of these findings the Commission concluded that petitioner "was and continues to be * * * a public utility" under the Act (R. I, 65, 67, 68, 69).

ARGUMENT

The court below properly affirmed the Commission's finding that petitioner is a "public utility" within the meaning of the Federal Power Act, and hence subject to the accounting requirements prescribed by the Commission pursuant to Section 301 (a) of the Act. This decision correctly applies the principles established in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, and *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953 (C. C. A. 2), certiorari denied 319 U. S. 741. No conflict with any decision is presented.

1. Section 313 (b) of the Act provides that "the finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive." The court below, determining that there was substantial evidence, sustained the Commission's findings (R. I, 66, 68, 69, 79–81) that out-of-state energy was received over petitioner's facilities in its East Hampton, Bristol and Winsted districts,[9] and that petitioner owned and operated "facilities for the transmission of electric energy in interstate commerce."[10] Petitioner argues that the court below erred in refusing to inquire whether the weight of the evidence supported the Commission's findings. (Pet. 31–32). We submit that this contention is without merit. The "substantial evidence" limitation upon judicial review extends to the Commission's findings of jurisdictional facts, such as interstate movement

[9] Since both the Commission and the court below relied, not upon the connections between petitioner's facilities and the C. P. 1 and C. P. 2 lines, but upon the movement of out-of-state energy over petitioner's facilities, there is obviously no validity to the asserted conflict (Pet. 15) between the decision of the court below and the statement in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, 72, that "mere connection determines nothing."

[10] The court below also sustained the Commission's findings (R. I, 64–65) that petitioner's facilities for supplying energy to Fishers Island, New York, were facilities for the transmission and sale at wholesale of electric energy in interstate commerce. While we believe this holding was proper, we find it unnecessary to discuss this aspect of the case. As we show herein, petitioner's ownership and operation of facilities receiving energy from the C. P. 1 and C. P. 2 lines afford an adequate basis for the Commission's jurisdiction.

of energy. In *Jersey Central Power & Light Company* v. *Federal Power Commission*, 319 U. S. 61, 67, this Court upheld, because supported by substantial evidence, a finding by the Commission that certain electric facilities located wholly within one state were utilized for the interstate transmission of electric energy. Jurisdictional findings made under other statutes have been similarly treated. *National Labor Relations Board* v. *Jones & Laughlin*, 301 U. S. 1; *Shields* v. *Utah Idaho R. Co.*, 305 U. S. 177, 186; *Gray* v. *Powell*, 314 U. S. 402; *Sunshine Coal Co.* v. *Adkins*, 310 U. S. 381, 390, 400; *Rochester Tel. Corp.* v. *United States*, 307 U. S. 125, 145–146; cf. *National Labor Relations Board* v. *Hearst Publications*, 322 U. S. 111, 130–131, and cases cited.

Petitioner does not here attack the substantiality of the evidence supporting the Commission's findings (see Specification of Errors No. 6, Pet. 12, 31–34). As the lower court properly held, there was substantial evidence (R. II, 388–474, 584–590, 474–543; R. III, 710–712; Exs. 61, 62; R. III, 1119–1120; R. II, 279–280, 293–294) to support the Commission's findings (R. I, 66, 68, 69, 79–81) that Massachusetts energy moved over petitoner's facilities.[11]

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[11] Properly qualified staff engineers for the Commission (R. II, 474–479, 388–389, 560, Tr. 1711) after tracing the energy flow from recorded meter readings by methods similar to those employed in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, 65–67, testified that in their expert opinion substantial amounts of elec-

2. Petitioner contends that, regardless of whether Massachusetts energy was received over petitioner's facilities at East Hampton, Bristol and Winsted, none of "these facilities were 'facilities for the transmission of electric energy in interstate commerce,' within the meaning of the Act," since "transmission in interstate commerce ended at least as soon as the energy reached the facilities of Petitioner." (Pet. 22–23).

It is difficult to determine from the petition whether this contention is intended to deny that petitioner owns and operates facilities for "trans-

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tric energy generated in Massachusetts and flowing over the Hartford-Agawam line entered the South Meadow substation, and was supplied over the C. P. 1 and C. P. 2 lines to petitioner's facilities at its East Hampton, Bristol, and Winsted districts (R. II, 388–474, 584–590, 474–543; R. III, 710–712; Exs. 61, 62). A study which did not purport to be exhaustive showed that there were 601 days between January 1, 1937, and May 26, 1941 (321 plus 280, R. II, 584, 442–443, 449, Ex. 62), during which electric energy from Massachusetts carried or helped carry the Bristol load continuously for one or more hours (R. II, 454–456, 584, 546, 549, 459). There was one instance of Massachusetts energy being supplied to all points on the C. P. 1 and C. P. 2 interstate trunk line for 45 hours consecutively, during 39 of which all loads on the line were carried by Massachusetts generators, and no Connecticut energy whatever was metered (R. II, 465–467). For two or more consecutive hours on 8 of the 21 days selected for illustrative purposes, Massachusetts energy alone supplied all loads between Hartford and Falls Village on the C. P. 1 and C. P. 2 lines (R. II, 410–412, 428–429, Ex. 61; R. II, 454–455). The testimony of petitioner's experts did not show that Massachusetts energy actually did not reach petitioner's facilities, but merely that such a flow cannot be proved with absolute scientific conclusiveness (R. II, 773–774, 776, 783, 804–817).

mission" of electric energy, as well as to deny that its facilities are for transmission "in interstate commerce." Any such contention would clearly be untenable. As the Commission found upon the basis of substantial expert testimony, "facilities for transmission of electric energy" necessarily include not only step-up transformers and lines leading therefrom, but also step-down transformers and appurtenant facilities (R. I, 75; R. II, 528–529; R. III, 995–997; R. II, 492–493, 502–504, 520, 531, 533–534). The interdependence of such facilities, which are all essential to the economic movement of electric energy in bulk over long distances, renders any attempt at segregation arbitrary and unrealistic (R. II, 528–529, 518–519).

Section 201 (c) of the Act, which is not referred to in the petition, specifically provides that for purposes of the Act "electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof." Since, as shown above, petitioner owns and operates facilities for "the transmission of electric energy," and since such energy includes energy transmitted from Massachusetts and consumed in Connecticut, petitioner owns and operates facilities for "the transmission of electric energy in interstate commerce" within the meaning of the Act. A contrary conclusion would be inconsistent with the decision of this Court in *Jersey Central Power & Light Co.* v. *Federal*

Power Commission, 319 U. S. 61, 72, where transmission facilities at the sending end of an integrated and instantaneous process of transmission of electric energy from one state to another were held to be subject to the Act, even though the facilities were wholly located in one state. No reason exists for treating differently transmission facilities at the receiving end of such a process of transmission. Cf. *Illinois Natural Gas Co.* v. *Public Service Co.*, 314 U. S. 498."

Petitioner also urges (Pet. 24) that the passage of electric energy through transformers before delivery to petitioner's facilities at the East Hampton and Winsted districts terminated the interstate journey of the energy. This argument seems to concede that the contrary is true at Bristol, since petitioner there owns the transformers, which reduce the voltage of the energy taken from the 66,000 volt C. P. 1 and C. P. 2 lines. In any

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" The authorities cited by petitioner, dealing with the power of the state to tax or regulate matters allegedly of an interstate nature (Pet. 22–23), are not pertinent to determine either the power of Congress to regulate petitioner's activities or the intention to do so under the Act. *United States* v. *South-Eastern Underwriters' Association*, No. 554, last Term, decided June 5, 1944; *Wickard* v. *Filburn*, 317 U. S. 111, 121–122; *Binderup* v. *Pathe Exchange*, 263 U. S. 291, 311; *Stafford* v. *Wallace*, 258 U. S. 495, 525–528. As this Court pointed out in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, 74–75, Section 301 (a) of the Act empowering the Commission to control accounting practices regulates "matters obviously subject to state regulation."

event, petitioner's contention is unsupported by any language in the Act, and was rejected by the Circuit Court of Appeals for the Second Circuit in *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953, 960, certiorari denied 319 U. S. 741. See also *Illinois Natural Gas Co.* v. *Public Service Co.*, 314 U. S. 498, 504."

3. Petitioner argues that even if certain of its facilities in East Hampton, Winsted and Bristol are facilities for the transmission of electric energy in interstate commerce, they are "used in local distribution" and therefore exempted from the Commission's jurisdiction by the "but clause" in Section 201 (b) of the Act." This argument misconceives the purpose of the "but clause." Both the court below (R. III, 1174–1175), and the Circuit Court of Appeals for

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[10] Petitioner's reliance upon the concluding phrase of the declaration of policy in Section 201 (a) of the Act ("* * * such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States") is of no avail, as this Court has held in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, 71–72.

[11] "* * * The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, *but shall not have jurisdiction, except as specifically provided in this Part and the Part next following*, over facilities used for the generation of electric energy or *over facilities used in local distribution* or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter." ("but clause" italicized in part.)

the Second Circuit in *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953, 961–962, certiorari denied, 319 U. S. 741, have held that the "but clause" does not restrict the expressly granted jurisdiction of the Commission over "all facilities" for transmission of electric energy in interstate commerce, the ownership or operation of which renders a company a "public utility" subject to the Act. On the contrary, these courts have held that the "but clause" is a negatively worded confirmation of the Commission's authority, to the extent "specifically provided" in the Act,[15] over facilities "used in local distribution," etc., when such facilities are owned by a "public utility." See 131 F. (2d) at 961–962; R. III, 1175.[16] This construction is supported by the legislative history of the Act. The statement of the House conferees accompanying

[15] E. g., issuance of Securities (Sec. 204 (a)); investigation of costs and depreciation (Sec. 208); records and accounts (Sec. 301 (a)).

[16] It is illogical to construe the "but clause" as petitioner contends, i. e., as carving out exceptions from the Commission's jurisdiction over "all facilities" for transmission or sale at wholesale of electric energy in *interstate* commerce. For, if that were the intention of the "but clause," it would be meaningless to exempt jurisdiction over facilities "used *only* for the transmission * * * in *intrastate* commerce." (Italics supplied.) The structure of the clause rather indicates, as the Circuit Court of Appeals for the Second Circuit held, that it specifies *additional* categories of facilities which under certain circumstances (where specifically so provided in the Act) come under the authority of the Commission.

the Conference Report, in referring to that part of the "but clause" which reads "except as specifically provided etc.," described it as a "clarifying phrase added to remove any doubt as to the Commission's jurisdiction over facilities used for the generation and local distribution of electric energy to the extent provided in other sections of this part and the part next following." H. Rep. No. 1903 (74th Cong., 1st Sess.), p. 74. It is noteworthy, also, that Congress did not adopt a proposal by the Solicitor of the National Association of Railroad and Utility Commissioners specifically to exempt companies purchasing interstate energy solely for local distribution. Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), p. 1661; Hearings, Senate Committee on Interstate Commerce on S. 1725 (74th Cong., 1st Sess.), p. 748."

CONCLUSION

The decision below is correct, and there is no conflict of authorities. Petitioner advances substantially the same contentions as those considered

[11] There is clearly no merit in petitioner's final argument (Pet. 40-43) that the court below improperly characterized petitioner's system as "essentially interstate." The court's description of petitioner's system was not advanced as an affirmative ground for jurisdiction, but merely to dispose of petitioner's "de minimis" argument, particularly with reference to the Groton facilities, and as we indicated earlier, *supra*, p. 10, n. 10, it is unnecessary to rely upon the Groton facilities to support the decision below. However, we believe that the court's characterization of petitioner's system as "essentially interstate" was apt.

and rejected in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61 and *Hartford Electric Light Company* v. *Federal Power Commission*, 131 F. (2d) 953 (C. C. A. 2), certiorari denied 319 U. S. 741. It is therefore respectfully submitted that the petition for a writ of certiorari should be denied.

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AUGUST 1944.

APPENDIX

THE FEDERAL POWER ACT OF 1935

Section 201 (49 Stat. 847, 16 U. S. C. 824) provides as follows:

> SECTION 201. (a) It is hereby declared that the business of transmitting and selling electric energy for ultimate distribution to the public is affected with a public interest, and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following and of that part of such business which consists of the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in interstate commerce is necessary to the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.
>
> (b) The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a State line. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifi-

cally provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

(c) For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States.

(d) The term "sale of electric energy at wholesale" when used in this Part means a sale of electric energy to any person for resale.

(e) The term "public utility" when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part.

(f) No provision in this Part shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State, or any agency, authority, or instrumentality of any one or more of the foregoing, or any corporation which is wholly owned, directly or indirectly, by any one or more of the foregoing, or any officer, agent, or employee of any of the foregoing acting as such in the course of his official duty, unless such provision makes specific reference thereto.

Section 204 (a) (49 Stat. 850, 16 U. S. C. 824c) provides as follows:

> SEC. 204. (a) No public utility shall issue any security, or assume any obligation or liability as guarantor, indorser, surety, or otherwise in respect of any security of another person, unless and until, and then only to the extent that, upon application by the public utility, the Commission by order authorizes such issue or assumption of liability. The Commission shall make such order only if it finds that such issue or assumption (a) is for some lawful object, within the corporate purposes of the applicant and compatible with the public interest, which is necessary or appropriate for or consistent with the proper performance by the applicant of service as a public utility and which will not impair its ability to perform that service, and (b) is reasonably necessary or appropriate for such purposes. The provisions of this section shall be effective six months after this Part takes effect.

Section 208 (49 Stat. 853, 16 U. S. C. 824g) provides as follows:

> SEC. 208. (a) The Commission may investigate and ascertain the actual legitimate cost of the property of every public utility, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation, and the fair value of such property.

(b) Every public utility upon request shall file with the Commission an inventory of all or any part of its property and a statement of the original cost thereof, and shall keep the Commission informed regarding the cost of all additions, betterments, extensions, and new construction.

Section 301 (a) (49 Stat. 854, 16 U. S. C. 825) provides as follows:

SEC. 301. (a) Every licensee and public utility shall make, keep, and preserve for such periods, such accounts, records of cost-accounting procedures, correspondence, memoranda, papers, books, and other records as the Commission may by rules and regulations prescribe as necessary or appropriate for purposes of the administration of this Act, including accounts, records, and memoranda of the generation, transmission, distribution, delivery, or sale of electric energy, the furnishing of services or facilities in connection therewith, and receipts and expenditures with respect to any of the foregoing: *Provided, however,* That nothing in this Act shall relieve any public utility from keeping any accounts, memoranda, or records which such public utility may be required to keep by or under authority of the laws of any State. The Commission may prescribe a system of accounts to be kept by licensees and public utilities and may classify such licensees and public utilities and prescribe a system of accounts for each class. The Commission, after notice and opportunity for hearing, may determine by order the accounts in which particular outlays and receipts shall be entered, charged, or credited. The burden of proof to justify every accounting

entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry, and the Commission may suspend a charge or credit pending submission of satisfactory proof in support thereof.

Section 313 (b) (49 Stat. 860, 16 U. S. C. 825*l* (b) provides, in part, as follows:

SEC. 313. (b) Any party to a proceeding under this Act aggrieved by an order issued by the Commission in such proceding may obtain a review of such order * * * in the United States Court of Appeals for the District of Columbia * * *. * * * The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive. * * *

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No. 189

In the Supreme Court of the United States

OCTOBER TERM, 1944

THE CONNECTICUT LIGHT AND POWER COMPANY,
PETITIONER

v.

FEDERAL POWER COMMISSION

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE FEDERAL POWER COMMISSION

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In the Supreme Court of the United States

OCTOBER TERM, 1944

No. 189

THE CONNECTICUT LIGHT AND POWER COMPANY,
PETITIONER

v.

FEDERAL POWER COMMISSION

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE FEDERAL POWER COMMISSION

OPINIONS BELOW

The opinion of the Court of Appeals for the District of Columbia (R. III, 1170) is reported in 141 F. (2d) 14. The Federal Power Commission's findings, opinion and order (R. I. 63–85) are reported in 44 P. U. R. (NS) 170.[1]

[1] The record in this case consists of both printed and unprinted material. The printed record (which was made an appendix to petitioner's brief below) is in three volumes, and will be cited herein as "R. I, R. II or R. III." The unprinted record, which was filed with the court below and has also been filed with this Court, consists of the transcript of the proceedings before the Commission (cited herein as "Tr.") and the exhibits (cited as "Ex.").

JURISDICTION

The judgment of the Court of Appeals for the District of Columbia was entered on February 28, 1944 (R. III, 1178). A petition for rehearing was denied on March 25, 1944 (R. III, 1195). The petition for a writ of certiorari was filed on June 23, 1944, and was granted on October 9, 1944. The jurisdiction of this Court rests upon Section 313 (b) of the Federal Power Act (49 Stat. 860, 16 U. S. C. 825*l*), and Section 240 (a) of the Judicial Code as amended by the Act of February 13, 1925.

QUESTION PRESENTED

Whether there was warrant in the record and a reasonable basis in law for the determination of the Federal Power Commission that petitioner "was and continues to be * * * a public utility" within the meaning of Section 201 (e) of the Federal Power Act.

STATUTE INVOLVED

The relevant provisions of the Federal Power Act of 1935 are set forth in Appendix A, *infra*, pp. 56–66.

STATEMENT

On August 26, 1935, the Federal Power Act became effective. On January 7, 1941, the Federal Power Commission issued an order (R. I, 48–52) directing petitioner to show cause "why it is not now, and has not been since August 26, 1935",

a "public utility" within the meaning of the Act, and why it had not complied with the Uniform System of Accounts prescribed by the Commission for such public utilities, effective January 1, 1937, and the Commission's orders supplemental thereto (R. I, 35–36, 40–47). Following an extensive hearing, the Commission, on May 13, 1942, found that petitioner was then, and had been at all times since August 26, 1935, a "public utility" within the meaning of the Act (R. I, 63–82). The Commission accordingly directed petitioner to reclassify and keep its accounts in accordance with the Commission's Uniform System of Accounts (R. I, 83). A petition for rehearing (R. I, 7–33) was denied on June 23, 1942 (R. I, 84–85). On petition for review (R. I, 1–33), the court below affirmed the Commission's order (R. III, 1178).

The undisputed facts shown by the record are as follows:

Petitioner owns and operates an electric utility system in the State of Connecticut (R. I, 63, 86; Ex. 70). Until two days before the Federal Power Act became effective, petitioner was a member of an interstate power pool, known as the Connecticut Valley Power Exchange (R. I, 70; R. II, 296),[2] which utilized the following lines for the interchange of energy: Petitioner's main system

[2] The operations of this Exchange are described in *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953 (C. C. A. 2), certiorari denied, 319 U. S. 741. In addition to The Hartford Electric Light Company and petitioner, the Exchange included Turners Falls Power and Elec-

was connected near New Britain, Connecticut, with the Hartford-Falls Village 66,000-volt double-circuit line ("C. P. 1 and C. P. 2 lines") of The Connecticut Power Company (R. III, 1113; Ex. 38; R. II, 295–297).[3] This line interconnected at its east end, through a substation in Hartford, with the Hartford-Agawam line running northward to Massachusetts[4] and at its west end, in Falls Village, Connecticut, with a line extending to Poughkeepsie, New York.[5] Over these lines, Central Hudson Gas and Electric Company and the members of the Connecticut Valley Power Exchange (including petitioner) interchanged energy among their systems in New York, Connecticut, and Massachusetts (R. I, 65–66; R. II, 276–279, 294–295).

In addition to the New Britain connection, pe-

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tric Company (R. II, 294–295). The transmission facilities of The Connecticut Power Company, a non-member, were used in Exchange operations under a toll contract (R. III, 1090–1096).

[3] A diagram of this system has been prepared by the staff of the Commission, and is set forth in Appendix C, *infra*, p. 70.

[4] R. I, 65; R. III, 1113; Ex. 38, R. II, 378–380, 394–396; R. III, 1119–1122. The Hartford-Agawam line was owned in Connecticut by The Connecticut Power Company and in Massachusetts by the Turners Falls Power & Electric Company (R. I, 396).

[5] R. II, 278–279, 394; R. III, 1113, Ex. 38. That line was owned in Connecticut by The Connecticut Power Company and in New York by the Central Hudson Gas & Electric Company (R. II, 396).

titioner maintained separate connections for taking energy from the C. P. 1 and C. P. 2 lines, to supply the major requirements of its East Hampton and Winsted districts (R. II, 397–402, 409, 473–474), and the entire requirements of its Bristol district (R. I, 68–69, 400–401).

For its East Hampton district, petitioner's twelve mile 13,800-volt line took energy from the C. P. 1 and C. P. 2 lines (through intervening facilities of The Connecticut Power Company) at "pole 110" in Portland to petitioner's step-down substations in East Hampton, Colchester, and Leesville, Connecticut, where the voltage was reduced and the energy distributed over petitioner's lines serving those communities and adjacent areas.[6]

For its Winsted district, petitioner's facilities took energy from the C. P. 1 and C. P. 2 lines through intervening facilities of The Torrington Electric Light Company in Torrington, after the voltage had been stepped-down to 2,300 volts.[7] Such facilities of petitioner included a step-up substation at Torrington, a ten-mile 27,600-volt, double-circuit line, and a step-down substation at Winsted where the voltage was reduced to 4,600 volts and the energy distributed over petitioner's lines serving Winsted and environs.[8]

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[6] R. I, 66–67; R. II, 491–493, 409, 401–402, 473–474, 392–397, 231–233; Ex. 26.

[7] R. I, 67; R. II, 394–395, 397, 399–400; Exs. 27, 80A.

[8] R. I, 68; R. II, 494; Exs. 79, 80A, 27, 60.

At Bristol, petitioner's facilities included an outdoor step-down substation with transformers and appurtenant facilities (including a synchronous condenser), and lines from petitioner's substation to supply consumers in Bristol and environs.[9] Energy was delivered at 66,000 volts over a short tap from the C. P. 1 and C. P. 2 lines to petitioner's substation at which the voltage was stepped-down to 2,300, 4,600, and 13,800 volts, and supplied to multiple circuits leading from the substation to serve consumers in and around Bristol.[10] The synchronous condenser was operated to maintain the "power factor" required by The Connecticut Power Company under its power-supply contract with petitioner (R. I, 69, 75; R. II, 228–230, 519–520, 528–529; R. III, 1040).

Considerable evidence was introduced at the hearing, showing that Massachusetts energy flowed frequently, for substantial periods and in substantial amounts, over the C. P. 1 and C. P. 2 lines, alone or in conjunction with Connecticut energy, to petitioner's facilities in its East Hampton, Winsted and Bristol districts.[11]

Apart from the facilities taking energy from the C. P. 1 and C. P. 2 lines, petitioner's main system was connected in the southeastern corner of Connecticut with the facilities of the Borough of

[9] R. I, 69; R. II, 493, 519. A simplified illustrative sketch of the Bristol substation, prepared from exhibits in the record, is set forth in Appendix D, *infra*, p. 69.

[10] R. I, 65, 68–69; R. II, 410, 493, 519–529; Ex. 82.

[11] R. II, 388–474, 584–590, 474–543; R. III, 710–712; Exs. 61–62; R. III, 1119–1120; R. II, 279–280, 293–294.

Groton, and petitioner sold energy generated at its Montville plant to the Borough which resold it in part (with petitioner's knowledge) to a company serving the entire requirements of Fishers Island, New York.[12] Such energy was transmitted over petitioner's 33,000-volt double-circuit line extending from its step-up substation at Montville to a substation at Groton Long Point, where the voltage was reduced to 6,900 volts and the energy conveyed to Fishers Island, New York, over facilities of the Borough and the company serving that island[13] (R. I, 64–65, 74, 77; R. III, 1141, 1049–1051; R. II, 462, 532–542, 180–207).

Seeking, as the circumstances clearly indicate, to avoid regulation by the Federal Power Commission (R. II, 359–363, 145–148),[14] petitioner, on August 24, 1935, two days before the Act took effect, severed the connection of its lines at New Britain with the C. P. 1 and C. P. 2 lines.[15] For

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[12] R. I, 74; R. III, 640, 642–643, 737; R. II, 357, 361, 462–464.

[13] On the basis of these operations the Company serving Fishers Island admitted its "public utility" status (R. III, 1048–1049; see R. I, 78).

[14] Proponents of the Act, by way of illustrating the accounting abuses sought to be remedied by the Act, specifically cited, during the debates in the House, write-ups aggregating $21,000,000 in the accounts of petitioner and two companies (Northern Connecticut Power Company and Connecticut Electric Service Company) since merged into petitioner (Moody's *Public Utilities*, 1942; p. 1151; *id.* 1936, p. 2549). See 79 Cong. Rec. 10421–10424.

[15] Petitioner severed this interconnection on the Saturday afternoon before the Monday on which the Act was approved by the President (R. II, 295–297). The Connecticut Power Company's lines were severed at the state boundary the next

similar reasons petitioner, in June 1939, severed its East Hampton connection,[16] in June 1941 discontinued taking energy for its Winsted district supplied by The Connecticut Power Company at Torrington,[17] and in February 1941 brought about the termination of the sale of energy by the Borough of Groton to Fishers Island.[18] However, presumably due to contractual commitments[19] and the difficulty of providing an alternative supply (R. II, 371), Bristol was not disconnected and is still supplied with energy from the C. P. 1 and C. P. 2 lines.[20]

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day, Sunday, August 25 (R. III, 1105–1106; R. II, 330–331). When satisfied that this had been done, petitioner reconnected at New Britain and thereafter engaged in intrastate pooling operations with The Hartford Electric Light Company (R. II, 297–299, 386). To avoid losing $100,000 a year (R. III, 1108), the interstate Exchange resumed operations on May 29, 1936, without petitioner, which had again severed its New Britain interconnection (R. II, 300). The members of the Exchange thereafter were The Connecticut Power Company, the Turners Falls Power & Electric Company, and the New England Power Company (R. III, 1084–1085). These companies do not contest their "public utility" status. R. II, 258; *Western Massachusetts Electric Company*, F. P. C. Op. No. 85, 46 P. U. R. (NS) 215, 217; *Connecticut River Power Company, et al.*, 2 F. P. C. 539; *New England Power Company, et al.*, 2 F. P. C. 612.

[16] R. I, 66, 73; R. II, 361–363; R. III, 764–765.

[17] R. II, 145–148, 138.

[18] R. I, 107–115; R. II, 178–179, 195–197; R. III, 1052–1053, 1145–1149.

[19] Petitioner's contract to purchase its power requirements for Bristol from The Connecticut Power Company is not terminable until January 1, 1947 (R. III, 1042).

[20] R. I, 69, 74; R. II, 369–371.

The Commission found that certain designated facilities of petitioner in its East Hampton and Winsted districts, prior to the disconnections, were "facilities for the transmission of electric energy in interstate commerce" (R. I, 67–68). It further found that petitioner's facilities for supplying Groton (until sales to Fishers Island were discontinued on February 28, 1941) were facilities for both the transmission of electric energy in interstate commerce and the sale of electric energy at wholesale in interstate commerce (R. I, 64–65). Finally, the Commission found that petitioner's synchronous condenser, step-down transformers and appurtenant facilities at Bristol "were and are facilities for the transmission of electric energy in interstate commerce" (R. I, 69). Upon the basis of these findings the Commission concluded that petitioner "was and continues to be * * * a public utility" under the Act (R. I, 65, 67, 68, 69).

SUMMARY OF ARGUMENT

Section 201 (b) of the Federal Power Act gives the Commission jurisdiction over "all facilities" for the "transmission of electric energy in interstate commerce" and the "sale of electric energy at wholesale in interstate commerce", but not, "except as specifically provided", over "facilities used in local distribution or only for transmission of electric energy in intrastate commerce". Under Section 201 (c) "electric energy

shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof". Since Congress did not define "transmission" or "facilities", the application of these terms to a particular situation must necessarily have been "assigned primarily" to the Federal Power Commission. (Cf. *National Labor Relations Board* v. *Hearst Publications*, 322 U. S. 111, 130–131.) The Commission's determination that petitioner "was and continues to be" a public utility under the Act has warrant in the record and a reasonable basis in law, and is supported by the principles established in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, and *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953 (C. C. A. 2), certiorari denied, 319 U. S. 741.

The Commission's finding that out-of-state energy was received over petitioner's facilities at Bristol is concededly supported by substantial evidence. Its finding that certain equipment at petitioner's Bristol substation constitutes "facilities for the transmission of electric energy in interstate commerce, as distinguished from "facilities ued in local distribution", is supported by the expert testimony of Commission engineers, and is based upon concepts contained in decisions of this Court familiar to the Congress which passed the Act.

That petitioner is engaged solely in the business of retail distribution at Bristol does not exempt it from the Act since, as this Court ruled in the *Jersey Central* case, the "determinative fact is the ownership of facilities used in transmission", not the kind of business in which a company is engaged. Compare Section 206 (b) of the Act. The so-called "but clause" in Section 201 (b) of the Act does not reduce the preceding grant of jurisdiction over "all facilities" for interstate transmission. This clause was inserted in order to emphasize that ownership or operation of the facilities described therein does not make a person a "public utility" under the Act, and to confirm the Commission's regulatory authority specifically granted elsewhere in the Act over such facilities when owned by a "public utility". Moreover, facilities devoted to any of the functions named in the "but clause" fall within it only if they are devoted exclusively to such function.

By taking jurisdiction over petitioner, the Commission is not invading the area reserved for state regulation. The Act has multiple purposes, including regulation of the interconnection and coordination of facilities; control over disposal, merger, or consolidation of facilities; control over the acquisition or issuance of securities; and maintenance of adequate interstate service—all of which were treated by Congress as independent subjects of regulation.

The Commission properly ordered petitioner to comply with its general accounting requirements for the period in which petitioner was a "public

utility." Regardless of petitioner's present status, it was a "public utility" until June 1941 by virtue of its ownership and operation of certain facilities at East Hampton, Winsted, and Groton. The termination of petitioner's status as a "public utility" could not cancel the obligation to comply with the accounting orders for the period in which petitioner was a public utility. While a company is not required to continue the ownership or operation of the facilities which make it a "public utility", it may not by voluntary termination of such status avoid the obligations that accrued during its status. Fulfillment of the obligation would not, as petitioner contends, be of "no practical benefit", for consumers and investors have a continuing interest in the elimination of any inflation in petitioner's accounts.

The considerations which justify the Commission's finding of jurisdiction over the Bristol facilities are applicable to the East Hampton and Winsted facilities. The Montville-Groton facilities are not exempt from the Commission's jurisdiction even though used in connection with the sale of energy to a municipal corporation. Even if the Act exempts sales to municipalities from regulation, it expressly grants jurisdiction over facilities for interstate transmission. Such facilities cannot be exempted from the Act merely because an additional ground for jurisdiction—facilities for sales—may not be present. The Commission has consistently construed the Act as applicable to interstate wholesale sales to municipal-

ities, and the legislative history indicates that such sales were intended to be subject to federal regulation.

Finally, there is no merit in petitioner's contention that, since the amount of energy transmitted to Fishers Island was relatively small, the rule of *de minimis* defeats the Commission's jurisdiction. There is no basis in the Act for the inference that Congress intended to make the Commission's jurisdiction depend on any particular volume of energy transmitted in interstate commerce.

ARGUMENT

Section 301 (a) of the Federal Power Act authorizes the Commission to "prescribe a system of accounts to be kept by * * * public utilities," which are defined by Section 201 (e) to include "any person who owns or operates facilities subject to the jurisdiction of the Commission" under Part II of the Act. Section 201 (b) of Part II gives the Commission jurisdiction over "all facilities" for the "transmission of electric energy in interstate commerce" and "the sale of electric energy at wholesale in interstate commerce," but not, "except as specifically provided", over "facilities used in local distribution or only for transmission of electric energy in intrastate commerce". And Section 201 (c) provides that, for the purposes of the Act, "electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any

point outside thereof; but only insofar as such transmission takes place within the United States".

The essential basis of the Commission's regulatory authority under Section 301 (a) of the Act is, therefore, ownership or operation of "facilities" for transmission of electric energy which is "transmitted" from one State and consumed at an outside point, or for sale of such energy at wholesale (i. e., for resale) in interstate commerce. Congress, however, nowhere in the Act defined "transmission" or "facilities." Hence, the task of applying these terms to particular factual situations must necessarily have been "assigned primarily to the agency created by Congress to administer the Act"—here the Federal Power Commission. See *National Labor Relations Board* v. *Hearst Publications,* 322 U. S. 111, 130–131. As this Court ruled in that case, "where the question is one of specific application of a broad statutory term in a proceeding in which the agency administering the statute must determine it initially, the reviewing court's function is limited" to ascertaining whether the agency's determination "has 'warrant in the record' and a reasonable basis in law." (322 U. S. at 131.)

The Commission adopted the view that transmission in interstate commerce "extends from the generator, where generation is complete (*Utah Power & Light Co.* v. *Pfost,* 286

U. S. 165, 181), to the point where the function of conveyance in bulk over a distance, which is the essential characteristic of 'transmission,' is completed and the process of subdividing the energy to serve ultimate consumers which is the characteristic of 'local distribution,' is begun (*Southern Gas Corp.* v. *Alabama,* 301 U. S. 148, 155; *East Ohio Gas Co.* v. *Tax Commission,* 283 U. S. 465, 471)." (R. I, 75). After pointing out that this distinction between "transmission" and "local distribution" accords with the use of these terms in the functional engineering sense, the Commission concluded that the term "facilities" for such transmission includes equipment which facilitates the conveying of energy in bulk over a distance (R. I, 77). The Commission, by applying these tests, found that certain equipment which petitioner owns and operates in the Bristol district constituted "facilities for the transmission of electric energy in interstate commerce" (R. I, 69, 75–76); that certain other equipment which petitioner owned and operated in the East Hampton and Winsted districts were such "facilities" until disconnected from the interstate power line in June 1939 and June 1941, respectively (R. I, 67–68); and that until February 1941, petitioner's equipment for supplying power to Groton were facilities for both the transmission of electric energy in interstate commerce and the sale of electric energy at wholesale in interstate commerce (R. I, 64–65).

Under Point I we shall urge that petitioner's ownership and operation of the Bristol substation is sufficient to support the Commission's conclusion that petitioner is a "public utility" under the Act. Under Point II we shall undertake to show that even if petitioner can no longer be regarded as a "public utility" within the meaning of the Act, it was proper, nevertheless, for the Commission to find that petitioner was a "public utility" while the Commission's accounting orders were in effect, and to order that petitioner comply with such orders for the period in which it was subject to the Commission's jurisdiction.

I

PETITIONER IS A "PUBLIC UTILITY" WITHIN THE MEANING OF THE FEDERAL POWER ACT.

There is no dispute as to the basic facts found by the Commission. However, petitioner challenges (Br. 50–52) the Commission's findings that "electric energy generated in Massachusetts was supplied" to petitioner's Bristol facilities "regularly, frequently, for substantial periods of time, and in substantial amounts" (R. I, 66, 68, 69, 79–81), and that the designated facilities at petitioner's Bristol substation are "facilities for the transmission of electric energy in interstate commerce", as distinguished from "facilities used in local distribution", and hence are subject to the

jurisdiction of the Commission (R. I, 69). We submit that these findings have warrant in the record and a reasonable basis in law, and were properly sustained by the court below. *Jersey Central Power and Light Company* v. *Federal Power Commission,* 319 U. S. 61, 67; *National Labor Relations Board* v. *Hearst Publications,* 322 U. S. 111, 130–131; *Gray* v. *Powell,* 314 U. S. 402; *Sunshine Coal Company* v. *Adkins,* 310 U. S. 381, 390, 400; *Rochester Telephone Corp.* v. *United States,* 307 U. S. 125, 145–146; *National Labor Relations Board* v. *Jones & Laughlin,* 301 U. S. 1; *United States* v. *Louisville & Nashville R. R. Co.,* 235 U. S. 314, 320.

A. THE EVIDENTIARY BASIS OF THE FINDING

Petitioner no longer challenges (Br. 14, 50–51) the substantiality of the evidence supporting the Commission's finding that Massachusetts energy flowed regularly, frequently, for substantial periods, and in substantial amounts, over its facilities in the Bristol district (R. I, 66, 68, 69, 79–81). Relying upon *Crowell* v. *Benson,* 285 U. S. 22, petitioner contends, however, that this is a finding as to a "jurisdictional fact" which must be supported by the weight of the evidence. This contention is without merit. As the cases cited in the preceding paragraph establish, the Commission's finding will not be set aside if supported by substantial evidence; and it is not disputed

that the finding rests upon such evidence.[21] See Section 313 (b) of the Federal Power Act, which provides that the Commission's findings of fact shall be conclusive if supported by substantial evidence (Appendix A, pp. 56–66, *infra*).

Petitioner's principal contention is that, regardless of whether Massachusetts energy moved

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[21] Properly qualified staff engineers for the Commission (R. II, 474–479, 388–389, 560, Tr. 1711) after tracing the energy flow from recorded meter readings by methods similar to those employed in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, 65–67, testified that in their expert opinion substantial amounts of electric energy generated in Massachusetts and flowing over the Hartford-Agawam line entered the South Meadow substation, and were supplied over the C. P. 1 and C. P. 2 lines to petitioner's facilities at its East Hampton, Bristol, and Winsted districts (R. II, 388–474, 584–590, 474–543; R. III, 710–712; Exs. 61, 62). A study which did not purport to be exhaustive showed that there were 601 days between January 1, 1937 and May 26, 1941 (321 plus 280, R. II, 584, 442–443, 499, Ex. 62), during which electric energy from Massachusetts carried or helped carry the Bristol load continuously for one or more hours (R. II, 454–456, 584, 546, 549, 459). There was one instance of Massachusetts energy being supplied to all points on the C. P. 1 and C. P. 2 interstate trunk line for 45 hours consecutively, during 39 of which all loads on the line were carried by Massachusetts generators, and no Connecticut energy whatever was metered (R. II, 465–467). For two or more consecutive hours on 8 of the 21 days selected for illustrative purposes, Massachusetts energy alone supplied all loads between Hartford and Falls Village on the C. P. 1 and C. P. 2 lines (R. II, 410–412, 428–429, Ex. 61; R. II, 454–455). The testimony of petitioner's experts did not attempt to show that Massachusetts energy actually did not reach petitioner's facilities, but merely that such a flow could not be proved with absolute scientific conclusiveness (R. III, 773–774, 776, 783, 804–817).

over petitioner's facilities at Bristol, the Commission was not warranted in finding that they were "facilities for the transmission of electric energy in interstate commerce" within the meaning of the Act. We submit, however, that there was ample basis in the record to support the Commission's finding (R. I, 69) that the designated facilities at the Bristol substation performed a "transmission" function and were not used in local distribution.[22] Commission Engineer Thomas, an electrical engineering expert (R. II, 474–479), explained "transmission" and "distribution" in their functional sense,[23] and testified that, on the basis of the function served,

[22] A Commission engineering expert testified that the distinction between the terms "transmission" and "local distribution" may vary, dependir. upon the purpose for which the terms are used or defined. Electric utility operating personnel may be designated as "transmission" or "distribution" according to certain predominant characteristics of their work. Utility accounting may reflect itemization into major categories called "transmission" and "distribution," determined by considerations of accounting principles and necessities. In view of these variations, the expert differentiated transmission facilities from local distribution facilities upon the basis of the functions which an analysis of their operations showed they served. (R. II, 499–500.)

[23] Thomas explained these terms as follows (R. II, 499–500):

"The transmission of energy in a utility system is the conveying of energy in bulk from a point at which it is available to a point at which it is needed. Its significance is transportation or conveyance.

"Distribution of energy in a utility system is a subdividing of the bulk energy delivered to a neighborhood among the

the Bristol facilities designated in the Commission's finding (including the outdoor step-down substation and the synchronous condenser) were "facilities for transmission" (R. II, 492–493, 499–500, 519–521, 528–529).

The Bristol facilities which the Commission found to be used for transmission are those facilities which it was necessary to install and use because the electric energy distributed and sold in Bristol was supplied from a distance instead of from nearby. (R. I, 75–77.) If transmission lines without transformers were used to bring energy from a distant source, it would be necessary to use such large copper conductors or suffer such high losses of energy in the line as to render the attempt uneconomical. (R. III, 997.) Such difficulty is avoided and economical long-distance transmission of power made possible by the use of high voltages, the corresponding reduction in current making possible the employment of relatively small conductors. But it is not commer-

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various consumers. Local distribution narrows the operation down to a group of consumers so closely associated as to use common distribution facilities without the necessity of considering the element of transmission between members of the group.

"Transmission facilities are characterized by the search for low energy losses and economy of structural costs; local distribution by the convenience of customers and of the public and the general necessity of accommodation to many structural limitations due to the use of public rights of way, private yards, esthetic considerations, and so forth."

cially feasible to generate electric energy at the required high voltages, and customer utilization at such voltages would be out of question. If long distance transmission is to be accomplished by the use of high voltage, therefore, it is necessary to employ apparatus (step-up transformers and substation facilities) to raise the voltage at the supply end and corresponding apparatus (step-down transformers and substation facilities) to lower the voltage at the receiving end. Petitioner's own experts corroborated the testimony of Commission engineers that such apparatus, as well as the connecting line of conductors, are necessarily used where electric energy in bulk is commercially conveyed over a distance too great for economical conveyance at generator voltage. (R. III. 997, 918–919; cf R. II, 493, 501–532). See A. E. Knowlton, *Standard Handbook for Electrical Engineers* (7th ed. 1941), p. 1156.

At Bristol there is another piece of electrical machinery which the Commission found to be a transmission facility: a synchronous condenser (R. III, 891, Ex. 82 [Tr. 3677]) which is like a generator in general appearance. The function of such a condenser, as explained by expert witnesses before the Commission (R. II, 519–520, 528–529; R. III, 891–895, 910–911, 1002, 1003; R. I, 228–230), may be summarized as follows:

A synchronous condenser prevents fluctuations in voltage, increases capacity in time of need, re-

duces line losses and facilitates long-distance transmission. Being a motor or generator electrically connected to the circuit but mechanically revolving freely, it takes the out-of-phase energy from the circuit, whether leading or lagging, stores it for the brief interval of a fraction of a cycle, and then returns it to the circuit. By eliminating the lagging or leading current from the circuit, it obviates the fluctuation in the voltage at the load end of the transmission line, and by eliminating the lagging current it increases the capacity of the facilities under heavy load all the way back through the generator and reduces line losses, thereby improving transmission line operation and making long-distance transmission a more satisfactory and more economic method of supplying electric energy to a load.[24]

These are the immediate results of synchronous condenser operation, and the effect on local distribution voltage is merely a product of these immediate results. Synchronous condensers are therefore as clearly transmission facilities as the lines

[24] For this reason, companies like The Connecticut Power Company selling electric energy from transmission lines, put clauses in their contracts requiring the maintenance of a prescribed power factor, i. e., fixing a limit to the lagging current. For example, see Ex. 43 (R. III, 1098); Ex. 8 (R. III, 1040).

themselves or any other appurtenant apparatus contributing to their economy and operation.[25]

B. THE FINDING HAS A REASONABLE BASIS IN LAW

In determining the meaning of "facilities" for the "transmission of electric energy in interstate commerce"—the test of the Commission's jurisdiction under the Act—the Commission (R. I, 75) referred to two decisions of this Court, *Utah Power & Light Co.* v. *Pfost,* 286 U. S. 165, and *East Ohio Gas Co.* v. *Tax Commission,* 283 U. S. 465. The *Pfost* case was cited in fixing the beginning of transmission in interstate commerce—i. e., where generation of the energy is complete (286 U. S. at 181), while the *East Ohio* case, *inter alia,* was invoked in defining approximately where such transmission ends—i. e., where the function of conveyance in bulk over a distance is completed

[25] Because synchronous condensers structurally are motors or generators, it is feasible to design them for the usual generator voltages but not for transmission line voltages; hence, they are connected on the low tension side of the transmission substation step-down transformers (as at Bristol, Ex. 26), and not directly to the transmission line. The point of connection, however, in no way affects their essential function. The following standard treatises and handbooks discuss the functions of the synchronous condenser: Lovell, *Generating Stations* (2d Ed. 1935), pp. 416–421; Marks, *Mechanical Engineers Handbook* (1st Ed. 1916), p. 1632; Knowlton, *Standard Handbook for Electrical Engineers* (7th Ed. 1941), pp. 635, 753, 754, 1048, 1156, 1185, 1327, 1712; Rushmore and Lof, *Hydro-Electric Power Stations* (2d Ed. 1923), p. 371; Bryant and Johnson, *Alternating Current Machinery* (1st Ed. 1935), p. 358.

and the process of subdividing the energy for local consumers is begun (283 U. S. at 471; *Southern Gas Corp.* v. *Alabama*, 301 U. S.148, 155).[26]

This distinction between "local distribution" and "interstate transmission", derived from judicial determinations of the highest authority, was found by the Commission to be in accord with the use of these terms in a functional engineering sense (R. I, 76). The Commission then relied upon expert engineering opinion to fix the precise boundary between the two functions in the particular case before it. While the *East Ohio* case recognized "interstate transmission" and "local distribution" to be mutually exclusive functions, it did not (nor does any other decision of this Court) establish a fixed point in an interstate electric circuit at which "interstate transmission" ended and "local distribution" began.[27] The judg-

[26] Since both the Commission and the court below relied, not upon the connections between petitioner's facilities and the C. P. 1 and C. P. 2 lines, but upon the movement of out-of-state energy over petitioner's facilities, there is obviously no validity to the asserted conflict (Pet. Br. 15) between the decision of the court below and the statement in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, 72, that "mere connection determines nothing."

[27] Contrary to petitioner's contention (Br. 34), no decision of this Court purported to decide at what precise point interstate commerce ended and local distribution began. *Public Utilities Commission* v. *Landon*, 249 U. S. 236, merely held that retail rates for natural gas sold to local consumers was subject to state regulation as a matter of intrastate commerce, and that the rates so regulated could not be challenged as confiscatory by receivers for the company supplying the

ment of engineering experts who testified before the Commission was that equipment such as that maintained by petitioner at Bristol, designed and used as one of the two necessary terminals of a power transmission system for the conveyance of high-voltage energy in large quantities, constituted "facilities for transmission" and not for "local distribution."

The *Pfost* and *East Ohio* cases are sound guides to the meaning of "transmission of electric energy in interstate commerce", since both cases were the prevailing judicial precedents at the time the Act was adopted and were frequently noted during the debates and hearings on the Act.[28] Moreover, the term "transmission", whether read in the technical sense described by the Commis-

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out-of-state gas to the local distributors. In *Missouri* v. *Kansas Gas Co.*, 265 U. S. 298, this Court held that the business of piping natural gas from one state to another and selling it at wholesale to local distributors is interstate commerce and that the rates for such sales could not properly be regulated by the states. While these cases recognize that natural gas is in intrastate commerce, after it is in the local supply mains running to the consumers' premises, the cases neither had to decide, nor purported to decide, where the "boundary" was between interstate commerce and local distribution.

[28] References to *East Ohio* case: Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), pp. 614, 666, 668, 675, 1340, 1635, 1679, 1695–96; Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), pp. 342, 761–62, 786–87, 1020; 79 Cong. Rec. 8628; 79 Cong. Rec. 10385–86.

References to *Pfost* case: S. Rep. No. 621 (74th Cong., 1st Sess.), pp. 48–49; 79 Cong. Rec. 10384–87.

sion's experts or in its familiar sense of the conveyance of energy, accurately describes the function performed by the designated facilities of petitioner at Bristol. The long distance bulk energy movement does not end until after the energy passes through the step-down transformers on to the low tension busses in the substation; hence, only at those busses could local distribution properly be said to begin.

This construction of the Act is in harmony with the decision of this Court in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61. There a line 7/8 of a mile long, located wholly within one state but carrying energy which reached a second state through facilities of an intervening company, was held by this Court to be subject to the Act. While those facilities were located near the "sending end" of an integrated and instantaneous process of transmission from one state to another, no reason exists for treating differently transmission facilities at the receiving end of such a system. This is more clearly apparent from *Illinois Natural Gas Co.* v. *Central Illinois Public Service Co.*, 314 U. S. 498 (cited in the *Jersey Central* opinion), where this Court recognized that transportation of natural gas, through a wholesale distributor's facilities located wholly within the receiving state, was in interstate commerce even after the gas was received at a reduced pressure from the inter-

state lines of the seller. Here petitioner takes the electric energy at its interstate transmission voltage (66,000 volts), and it is thereafter reduced.

Petitioner contends that "the Act was not intended to regulate a local distributing company"; that it is engaged only in the business of retail distribution at Bristol; and that it is, therefore, exempt from the Commission's jurisdiction (Br. 23–32). This contention has effectively been answered by *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, where this Court ruled that it is not the kind of business in which a company is engaged that is "determinative of its inclusion in this act;" the "determinative fact is the ownership of facilities used in transmission." (319 U. S. at 73). The record shows that the step-down substation at Bristol includes facilities that a transmission or generating company would ordinarily use for transmitting energy to a retail distributor. The fact that such facilities happen to be owned in this case by the retail distributor, contrary to the usual practice, does not alter the character of the facilities and cannot affect their inclusion within the Commission's jurisdiction under the Act.[29]

[29] There is nothing in the record to support the statement of the National Association of Railroad and Utilities Commissioners (Br. in support of Pet. for Cert., 23) that local distributing companies must own step-down substation facilities such as those at Bristol in order to engage in the business of local distribution. Indeed, it is unusual for local distributing companies to own the step-down substations, such

Indeed, the Act expressly recognizes that local distributing companies may own facilities subject to the Commission's jurisdiction, even though the Commission may have no authority over any of the company's rates. Thus, Section 206 (b) provides that "The Commission upon its own motion, or upon the request of any State commission * * * may investigate and determine the cost of * * * transmission of electric energy by means of facilities under the jurisdiction of the Commission in cases where the Commission has no authority to establish a rate governing the sale of such energy." Since the only sale of out-of-state energy for which the Commission "has no authority to establish a rate" is the sale to ultimate consumers, normally made by a retail distributor, the Act must here be referring to transmission facilities owned by a local distributing company.

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facilities ordinarily being maintained and operated by the company having the necessary facilities and personnel for high-tension operation and maintenance. Although petitioner has asserted that a "survey made by the Edison Electric Institute" shows there are "over 1,000 small companies which buy energy from larger systems, the supply of almost all of which may have some component from an interstate source" (Pet. for Cert., p. 14), an informal survey by the Federal Power Commission shows that out of the total of approximately 1,000 privately-owned electric utilities there are only twelve which own or operate step-down substation facilities for taking out-of-state energy, and which otherwise would not be public utilities under the Act. Clearly, by the order under review the Commission neither purports nor intends to assume jurisdiction under Section 201 (b) over the facilities of all local distributing companies.

This view is confirmed by the statement of the House Committee that Section 206 (b) "reaches those situations where electric *energy is transmitted* in interstate commerce *by the same company which distributes it locally,* and will greatly aid State commissions in fixing reasonable rates in such cases." [Italics supplied.] H. Rep. No. 1318, 74th Cong., 1st Sess., p. 29). It is further reinforced by the fact that Congress rejected the proposal of the Solicitor of the National Association of Railroad and Utilities Commissioners that companies purchasing interstate energy solely for local distribution be specifically exempted from the Act. Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), p. 1661; Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), p. 748. There is no justification for petitioner's attempt to write such an exemption into the Act by judicial construction.

Petitioner places considerable reliance (Br. 38 *et seq.*) upon the so-called "but clause" in Section 201 (b) of the Act:

> The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy [in interstate commerce], but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities

> used for the generation of electric energy or over facilities used in local distribution or only for transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

Petitioner argues that the "but clause" is designed to reduce the earlier grant of authority over "all facilities." Analysis of the statute and its legislative history reveals, however, that the "but clause" was inserted out of an abundance of legislative caution in order to emphasize that while ownership or operation of the facalities described therein does not make a person a "public utility" under the Act, the Commission's regulatory authority specifically granted in other sections of the Act extends to facilities named in the "but clause" when owned by a "public utility." The "but clause" and the preceding grant of jurisdiction over "all facilities" for interstate transmission, when read together, are complementary and do not create overlapping categories. The "but clause" clarifies but does not limit the scope of the preceding "all facilities" clause.

When the Act was adopted, each of the four functions enumerated in the "but clause" was considered under prevailing judicial authority to be separate and clearly distinguishable from "trans-

mission in interstate commerce." Thus, "generation" had been distinguished from interstate transmission (*Utah Power & Light Co.* v. *Pfost*, 286 U. S. 165, 181); "local distribution" from interstate transmission (*East Ohio Gas Co.* v. *Tax Commission*, 283 U. S. 465, 470–472);[30] and transmission for consumption by the transmitter itself from the ordinary scope of interstate commerce (*The Pipe Line Cases*, 234 U. S. 548, 562).[31] And, of course, transmission which is only intrastate is *ex hypothesi* not interstate transmission. Other portions of the legislative history confirm the inference that the functions described in the "but clause" were understood to be separate from interstate transmission.[32] The proper interpretation of the "but clause" is, therefore, that it refers to functions other than transmission in

[30] See p. 25, n. 29, *supra*.

[31] Cf. *Pennsylvania Railroad Co.* v. *Pittsburgh L. & W. R. Co.*, 83 F. (2d) 861, 865 (C. C. A. 6), certiorari denied, 299 U. S. 572; *Superior Oil Co.* v. *Mississippi*, 280 U. S. 390, 395; *Dept. of Treasury of Indiana* v. *Wood Preserving Corp.*, 313 U. S. 62.

[32] Thus, a proposed amendment to Section 201 (c)—then numbered 201 (b)—was submitted by the Solicitor of the National Association of Railroad and Utilities Commissioners, in the form of a proviso that—

> "* * * after electric energy has been transmitted into one State from another State, or from a foreign country, if the voltage is reduced for the purpose of enabling the same to be distributed to local consumers; or if such electric energy is in any manner so distributed,

interstate commerce (see *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 68, 72), and that the affirmative grant of authority in Section 201 (b) over "all facilities" for the "transmission of electric energy in interstate commerce" is the complete measure of the facilities ownership or operation of which renders a person a "public utility" within the meaning of the Act. *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953, 961–962 (C. C. A. 2), certiorari denied, 319 U. S. 741.[35]

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any transmission for the purpose, or in the course of such distribution, shall be deemed to be in intrastate commerce or in local distribution not subject to the jurisdiction of the Commission." Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), p. 1661; Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), pp. 748–49.

Although not adopted, the proposal indicates that "local distribution" was understood to come after interstate "transmission" and to be separate therefrom.

Similarly, production was treated as distinct from interstate transmission, for it was included along with "transmission in interstate commerce," in the affirmative grant of jurisdiction in Section 201 (b), until deleted from that grant by the House.

[35] The choice of the words "used *in*" local distribution when contrasted with the words "used *for*," generation, intrastate transmission, and transmission for consumption by the transmitter suggests that both Houses of Congress employed the words "used *in*" when referring to local distribution (rather than "used *for*") to make clear the intention not to include in the "but clause," facilities employed for the purpose of supplying energy to be locally distributed, but not actually used in distributing the energy locally.

Moreover, facilities devoted to any of the functions named in the "but clause" fall within its exemption only if they are devoted exclusively to such function. If facilities serve a dual function—e. g., both interstate and intrastate transmission, or interstate transmission and local distribution—they cannot be covered by the "but clause." The clause refers to "facilities used * * * only for the transmission of electric energy in intrastate commerce;" if there is an admixture of intrastate with interstate transmission over the same facilities, such facilities are not used only for intrastate transmission, and are within the Commission's jurisdiction over "all facilities" for interstate transmission. *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61.[34] While the term

[34] It is argued by the State of Connecticut that petitioner's Bristol facilities are used "only for the transmission of electric energy in intrastate commerce" and thus excluded by Section 201 (b) from the jurisdiction of the Commission. (Br. in support of Pet. for Cert., 28-29.) But this argument ignores Section 201 (c) of the Act which states that "electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof." Transmission not embraced within this definition—"intrastate transmission"—must therefore be distinguished from "interstate transmission" as not involving electric energy "transmitted from a State and consumed outside thereof." Since the Bristol facilities take out-of-state energy, they clearly cannot be intrastate transmission facilities within the meaning of the Act. Moreover, contrary to the contention of the State of Connecticut, failure to hold petitioner's Bristol facilities to be used "only for transmission of electric energy in intrastate commerce" will not mean

"only" is not used in connection with local distribution, the legislative history shows that the phrase "facilities used in local distribution" was intended to cover only those facilities which are used exclusively in local distribution. As it appeared in the bill passed by the Senate (S. 2796, S. Rep. No. 621, 74th Cong., 1st Sess.), the "but clause" was expressed as an exception to the preceding affirmative grant (which at that stage included jurisdiction over production of energy for interstate commerce)—"except facilities used *only* for the production or transmission of electric energy in intrastate commerce or in local distribution or for the use of the producer or transmitter." [Italics supplied.] The choice of the word "only" clearly showed that local distribution facilities were excepted only if used exclusively in local distribution. This purpose was confirmed by the Senate Committee Report, which stated that "all of the facilities, other than those used *solely* for retail distribution, are made subject to the jurisdiction of the Commission." [Italics supplied.] (S. Rep. No. 621, 74th Cong., 1st Sess., p. 48.) And no change in this respect was intended by the House, for the House report stated that "*As in the Senate bill* no jurisdiction

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that the Commission will then have jurisdiction over all petitioner's facilities up to the consumers' appliances, for the Commission admits that ownership of facilities used only *in* local distribution of out-of-state energy furnish no basis for its jurisdiction under Section 201 (b) of the Act.

is given over local distribution of electric energy, and the authority of States to fix local rates is not disturbed even in those cases where the energy is brought in from another State." [Italics supplied.] (H. Rep. No. 1318, 74th Cong., 1st Sess., p. 27.) Although the bill underwent changes in conference, and the term "only" emerged as a qualification upon intrastate transmission, there is no indication of an intention to depart from the purpose expressed by both the House and the Senate Committees.[35]

[35] The form of the "but clause" is readily explained by the evolution of Section 201 (b) of the Act. In the original bills (H. R. 5423 and its companion bill S. 1725, 74th Cong., 1st Sess.), as well as in the bill reported by the Senate (S. 2796, 74th Cong., 1st Sess.), the affirmative grant of jurisdiction included not only all facilities for interstate transmission and sale at wholesale, and all facilities for production of energy for such transmission and sale, but also "all facilities connected therewith as parts of a system of power transmission situated in more than one State." Since the provision for all connected facilities would obviously cover intrastate transmission and local distribution facilities physically connected with an interstate system, the "except clause" which followed the affirmative grant clearly operated as an exception, reducing the scope of the preceding affirmative grant. However, when the Senate bill was amended and reported by the House, the affirmative grant no longer included production facilities or connected facilities, the "except clause" had been transformed into a "but clause," and in order to stress the elimination of production facilities, the House had added to the "but clause," facilities used for "generation." At this stage, the "but clause" no longer had a carving out function.

The "but" phraseology, when first introduced in the bill, was not considered as an excepting or curtailing clause. Thus, when Dozier A. DeVane, Solicitor for the Federal

The phrase "except as specifically provided in this Part and the Part next following" was inserted in the clause by the Conference Committee "to remove any doubt as to the Commission's jurisdiction (over facilities used for the generation and local distribution) of electric energy to the extent provided in other sections" of Parts II and III of the Act. H. Rep. No. 1903 (74th Cong., 1st Sess.), p. 74. In this aspect, the "but clause" confirms the Commission's authority, to the extent "specifically provided" in other sections of the Act, over facilities "used in local distribution," etc., when such facilities are owned by a "public utility." *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. (2d) 953, 961–962 (C. C. A. 2), certiorari denied, 319 U. S. 741."

Petitioner also argues that the Commission is seeking to invade the area reserved for state

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Power Commission, and one of the original draftsmen of the bill (Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), p. 223), explained the reason for inserting into the first sentence of Section 201 (b)—then numbered Section 201 (a)—the clause "but shall not apply to the retail sale of electric energy in local distribution," he stated that it was not intended to change the policy otherwise set forth in the bill, but merely to make the policy clear. Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), pp. 497, 523.

[36] The Act vests such authority in the Commission in respect of the issuance of securities (Sec. 204 (a)); the investigation of costs and depreciation (Sec. 208); the keeping of records and accounts (Sec. 301 (a)).

regulation, and in effect urges that the purpose of the Act is limited to wholesale rate regulation in order to supplement state regulation of retail rates (Br. 23–27). But the Act itself refutes any notion that it is devoted solely to rate regulation. Thus, it seeks to promote the interconnection and coordination of facilities (Sec. 202); it requires Commission approval for the disposal, merger, or consolidation of facilities or for the acquisition of securities of any other public utility (Sec. 203); it conditions the issuance of securities upon Commission authority (Sec. 204); it provides for the maintenance of adequate interstate service (Sec. 207); and it authorizes the regulation of accounting practices (Sec. 301).

That these were all considered independent subjects of regulation appears from the Senate Report on the bill (S. Rep. No. 621, 74th Cong., 1st Sess., p. 18), which treats the regulation of wholesale rates as simply one element of the proposed legislation.[37] Referring to Section 203 (a) providing for Commission control over the disposal, merger or consolidation of facilities, the Committee characterized this section as furnishing "an

[37] "Part 2 places the utilities under the regulated conditions which have been prescribed for the principal other national utilities. Commission approval is required before they may issue new securities or consolidate or transfer their operating properties. The Commission is authorized to prescribe the form in which their accounts are to be kept. The sale price of energy sold at wholesale in interstate commerce is made subject to Commission determination."

essential check upon the development of the industry along uneconomic lines" and as complementing "title I of the bill by directing the Commission to prevent transfers or consolidation of property which would impair the ability of public utilities to render adequate service or impede, or tend to impede, the coordination in the public interest of facilities subject to the jurisdiction of the Commission." *Id.*, p. 50. Again, in explaining the Commission's control over the acquisition of securities of other public utilities, the Senate Report stated that "in this way the Commission would have authority to keep the same kind of check upon the creation of spheres of influence among operating companies that the Securities and Exchange Commission has over holding companies under title I." (*Ibid.*) Cf. *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, 75–76.

Petitioner points (Br. 46–47) to an alleged inconsistency between the position taken here and the Note in its Uniform System of Accounts, which states that "Stations which change the energy from transmission to distribution voltage shall be classified as distribution stations." The accounting instruction preceding this Note clearly states that it is for the "purpose of this system of accounts," and the instruction includes a statement that the facilities described therein are to be classified as part of the distribution system "whether or not" they "are operated as part of a

transmission system or as part of a distribution system." Federal Power Commission, Uniform System of Accounts Prescribed for Public Utilities and Licensees, Revised to December 31, 1936, p. 52 (see Appendix B, pp. 68–69, *infra*). Indeed, petitioner's own system maps as of March 1, 1938, and December 1, 1938, classify its Bristol substation as a "Transmission Substation" while other of its substations are listed on the same maps as "Distribution Substations." (Exs. 68 and 69; but cf. Ex. 70).[38]

II. REGARDLESS OF PETITIONER'S PRESENT STATUS, IT WAS A "PUBLIC UTILITY" WHILE THE COMMISSION'S ACCOUNTING ORDERS WERE IN EFFECT, AND IT REMAINS UNDER A DUTY TO COMPLY WITH SUCH ORDERS FOR THE PERIOD IN WHICH IT WAS SUBJECT TO THE COMMISSION'S JURISDICTION

Apart from the Bristol facilities, we submit that the Commission properly found that petitioner was a "public utility" until June 1941, on account of its ownership and operation of certain facilities at East Hampton, Winsted, and Groton. The Commission's accounting orders were

[38] The State of Connecticut argues (Br. in Support of Pet. for Cert. 30–31) that the Commission's construction would interfere with the power of the State to regulate local distributing companies, since the petitioner would be required to comply with both Federal and State accounting requirements which it is said might be conflicting as to specific items in the accounts. This Court in *Northwestern Electric Co.* v. *Federal Power Commission*, 321 U. S. 119, rejected an identical argument.

outstanding and performance thereunder was due before June 1941." Since the Commission in the case at bar has directed compliance "as of the effective dates of such orders" (R. I, 33), we submit that the order is valid insofar as it requires petitioner to comply with these orders for the period in which it was a "public utility."

A. Termination of petitioner's status as a "public utility" could not cancel the obligation to comply with the Commission's accounting orders for the period in which petitioner was a "public utility"

If petitioner was a "public utility" while the Commission's accounting orders were outstanding, petitioner's duty to comply therewith for the period in which it was a "public utility" was not discharged by its subsequent change in status. Admittedly, the Act does not require a company to continue the ownership or operation of the facilities which make it a "public utility." *Re Twin State Gas & Electric Co.*, 33 P. U. R. (NS) 39." But it does not follow, and the Commission

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"Order No. 43 prescribing the Uniform System of Accounts was issued on June 10, 1936, and became effective January 1, 1937 (R. I, 35-36). A supplemental order with respect to Electric Plant Accounts Instruction 2-D of the Uniform System of Accounts was issued on May 11, 1937 (R. I, 40-43). The reclassification of accounts in accordance with the foregoing orders was required to be completed by January 1, 1939.

"In the *Twin State* case, the Commission approved the sale of certain transmission facilities by a "public utility" even though the sale might have been "a step in the direction that eventually results in the vendor company obtaining a status other than that of a 'public utility' * * *."

has never held, that a company whose status has so changed is entitled to disregard obligations which accrued for the period in which it was a "public utility." Public rights are here involved, and the company, by its own voluntary acts, can neither foreclose "nor prevent the assertion thereof by the Government as a substantial trustee for the public." Cf. *United States* v. *Trans-Missouri Freight Association*, 166 U. S. 290, 309–310; *Federal Trade Commission* v. *Goodyear Tire & Rubber Company*, 304 U. S. 257, 260; *Oklahoma-Texas Trust* v. *Securities and Exchange Commission*, 100 F. (2d) 888, 892–893 (C. C. A. 10); *United States* v. *Bates Valve Bag Corporation*, 39 F. (2d) 162, 164–165 (D. Del.); *National Labor Relations Board* v. *Cleveland-Cliffs Iron Co.*, 133 F. (2d) 295 (C. C. A. 6).

Nor would the imposition of such obligations upon petitioner for the period in question result in "a mere waste of time," or be of "no practical benefit," as petitioner charges (Br. 61). As has already been noted (p. 7, note 14, *supra*), proponents of the Act, by way of illustrating the accounting abuses sought to be remedied thereby, specifically cited during the debates in the House alleged write-ups aggregating $21,000,000 in the accounts of petitioner and two companies (Northern Connecticut Power Company and Connecticut Electric Service Company) since merged into petitioner.[a] 79 Cong. Rec. 10421–10424. Cer-

[a] Moody's *Public Utilities*, 1942, p. 1151; *Id.* 1934, p. 2549.

tainly consumers and investors in petitioner's securities have a continuing interest in the determination and elimination of any inflation in petitioner's accounts. *Northwestern Electric Co.* v. *Federal Power Commission*, 321 U. S. 119. The Federal Trade Commission's extensive investigation of public utilities revealed numerous abuses in the public utility industry, including financial manipulation and exploitation, whereby the fixed assets of public utilities were written up or inflated, through one device or another, by approximately one and one-half billion dollars, such inflation being evidenced for the most part by the issuance of "watered" stock and the creation of fictitious surpluses (Sen. Doc. 92, Part 72–A, pp. 235–275, 282–293, 298–304; Part 73–A, pp. 1, 13–14, 28, 62–64, 109, 139; 79 Cong. Rec. 8384).

At the hearings on the Federal Power Act, witnesses, including representatives of the utility industry, emphasized the importance of uniform and sound accounting regulation as an aid to the elimination of past abuses and the prevention of their recurrence (Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), pp. 345, 807–809, 1106–1107, 1307–1308, 1920). There was testimony that sound accounting alone was sufficient to cure the abuses (*id.*, pp. 919, 1343), and the report of the Senate Committee on Interstate Commerce stated

categorically that "The authority of the Commission over the accounts of companies under its jurisdiction extends to the entire business of such companies." (S. Rep. No. 621, 74th Cong., 1st Sess., p. 53.)" Clearly, Congress contemplated full application of the accounting powers conferred."

The fact that the Commission itself does not have authority to regulate petitioner's retail rates,

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"See also H. Rep. No. 1318 (74th Cong., 1st Sess.), pp. 30–31.

"An attempt was made to limit the federal accounting authority conferred by the Act by providing that "If, with respect to * * * the method of keeping accounts, * * * any person is subject to the law of any State or regulation by a State commission, such person shall not be subject to the requirements [of the Act] with respect to the same subject matter." Although it was adopted in the House (79 Cong. Rec. 10574–10575), the Conference Committee eliminated it (H. Rep. No. 1903, 74th Cong., 1st Sess., pp. 63, 75). Representative Lea, a member of the House Committee on Interstate and Foreign Commerce which reported the bill, objected to the amendment on the ground that it "would largely destroy the usefulness of the Federal regulation this bill gives to the Federal Power Commission. We cannot have effective regulation unless we give that Commission the power to get information and give it control over accounts and valuations. The amendment * * * would destroy effective control over the accounts * * * of these utility companies. It would compel the Federal Government to accept State valuations, made in some instances without adequate information and sometimes in total disregard of the rights of the people of other States whose interests, rates, investors, and consumers are involved. * * *" (79 Cong. Rec. 10574–10575).

or its issuance of securities," does not detract from the value of the accounting information here sought. The very requirement that such information be filed in itself tends to discourage further write-ups and inflation of accounts, and the publication of the information would amount to "regulation by the informatory process" which this Court has upheld, irrespective of the existence or exercise of other regulatory power which might be aided by the information so published. *Electric Bond & Share Co.* v. *Securities and Exchange Commission*, 303 U. S. 419, 435–439; *Valvoline Oil Co.* v. *United States*, 308 U. S. 141, 146; cf. II Sharfman, *The Interstate Commerce Commission*, pp. 96–100; see Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.) p. 276; Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.) pp. 284, 366, 553.[*] Compare Sec. 307 (a), which authorizes

[*] Section 204 (f) states that the Commission's regulatory power over security issues "shall not extend to a public utility organized and operating in a State under the laws of which its security issues are regulated by a State commission" (as is the case with petitioner).

[*] See also Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), p. 2170; Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), pp. 265, 275, 347. During the debates, Representative Lea said (79 Cong. Rec. 10370–79): "One of the most important features in this measure, as I view it, is that referring to accounts. The theory of this bill is to provide a unified accounting system

the Commission to publish information secured under its broad investigatory powers.

It is noteworthy that Congress did not make provision for a period of grace in which companies might decide whether to continue interstate operations subject to the obligations of the Act or to cease such operations and avoid the requirements of the Act." Yet, if petitioner's view were to prevail, petitioner will have had a period of grace from August 26, 1935, until June, 1941, when the G. P. 1 and 2 connections at Winsted were terminated. For more than five years, petitioner will have enjoyed all the benefits of an interstate business (which the Congress has declared a business affected with a public interest), without having performed any of the obligations imposed upon such a business by the Act. In effect, then, petitioner will have postponed the effective date of the Act by its own action, from August 1935 to June 1941."

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for the public utilities of the United States. It would provide a common language for accounting methods and meanings. It would help to standardize accounting methods and give stability and certainty to utility values."

"The bill as passed by the Congress was presented to the President on August 24, 1935, was approved and signed by the President on August 26, 1935, and became effective immediately. 79 Cong. Rec. 14690-14691.

"With respect to petitioner's tactics, the Commission said (R. I, 72):

"* * * Respondent seems to have assumed that it had a choice of policies: (1) it could comply with all requirements under the Act until it should have severed these interconnections and thereby have ceased to own or operate facili-

B. Petitioner's East Hampton and Winsted facilities were subject to the jurisdiction of the Commission until June 1939 and June 1941, respectively

All of the considerations which justify the Commission's finding of jurisdiction over the Bristol facilities are equally applicable (except with regard to the synchronous condenser) to the East Hampton and Winsted facilities, and need not be repeated here. The facilities at the Winsted district included a *step-up* substation, and a 10-mile double-circuit, 27,000-volt line, in addition to a step-down substation; and the facilities at the East Hampton district included a 12-mile, 13,800-volt line in addition to three step-down substations. (See Diagram, Appendix C, *infra*, p. 69.)

C. Petitioner's Montville-Groton facilities were subject to the Commission's jurisdiction until February 1941

Petitioner admits that throughout the period from August 26, 1935, when the Act took effect,

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ties for the transmission or sale of electric energy in interstate commerce; or (2) it could carefully watch the administration of the Act in practice; could postpone outright refusal to comply by a temporizing attitude of responding in some fashion to those requirements of the Commission which did not involve any issue deemed important, thus deferring as long as possible a showdown on the jurisdictional question; and in the meantime it could move as rapidly as circumstances would permit and the assiduity (and availability of funds) of the Commission should dictate, to eliminate interconnections on which the Commission might, in practice, hold it to be a 'public utility' under the Act.

"That is to say, Respondent appears to have assumed that it had a choice of obeying the law or avoiding being caught. Respondent chose to try the latter alternative. * * *"

until February 1941, electric energy was transmitted from Groton Long Point, Connecticut, and thereafter distributed and sold to the public on Fishers Island, New York, and that petitioner's facilities in Connecticut were the only possible source of that energy (Br. 53–54; R. III, 642–643, 737; R. II, 357, 360–361; cf. R. II, 462–464). Furthermore, petitioner does not challenge the finding (R. I, 64) that its facilities for supplying that energy were "transmission facilities." Although all the elements of coverage under the Act would thus be present (*Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61), petitioner argues that these facilities are exempt from the Commissioner's jurisdiction because (1) they were used in connection with the sale of energy to a municipal corporation, and (2) the resale of the energy by the Borough to Fishers Island should be disregarded on the theory of *de minimis non curat lex* (Br. 53–59). We submit that these contentions were properly rejected by the court below.

(1) Petitioner argues that the Act exempts sales to municipalities from regulation, and therefore that Congress must also have intended to exempt facilities for transmission in connection with such sales. Section 201 (b) of the Act, however, expressly grants jurisdiction to the Commission not only over "facilities (1) for interstate *transmission* but also—and *disjunctively*—over facilities (2) for interstate wholesale *sales*." *Hartford*

Electric Light Company v. *Federal Power Commission*, 131 F. (2d) 953, 961 (C. C. A. 2), certiorari denied, 319 U. S. 741. This wording, according to the Senate Committee, was employed in order "to make plain that it includes interstate transmission where there is no sale." S. Rep. No. 621 (74th Cong., 1st Sess.), p. 19. Petitioner's conceded ownership of facilities for the interstate transmission of electric energy is sufficient in itself, therefore, to support the jurisdiction of the Commission. *Jersey Central Power & Light Company* v. *Federal Power Commission*, 319 U. S. 61. The ownership and operation of facilities for interstate wholesale sales is thus a wholly independent ground of jurisdiction (*Hartford Electric Light Co.* v. *Federal Power Commission*, *supra*). Accordingly, facilities for interstate transmission—an adequate ground for jurisdiction—cannot be exempted from the Act merely because an additional ground for jurisdiction—facilities for sales—may not be present.

In any event, petitioner's sales to the Borough of Groton were properly held by the Commission to be within the scope of the Act, thereby rendering petitioner's facilities for such sales subject to the jurisdiction of the Commission (R. I, 78). The Commission has consistently construed the Act as applicable to interstate wholesale sales to municipalities, see *City of Los Angeles* v. *Nevada-California Electric Corp.*, 32 P. U. R. (NS) 190, 196-199; *Re Otter Tail Power Company*, 33

P. U. R. (NS) 257, 259–262. This interpretation of the Act by the agency charged with its administration is entitled, of course, to great weight. *Norwegian Nitrogen Products Co.* v. *United States*, 288 U. S. 294; *United States* v. *American Trucking Associations*, 310 U. S. 534, 549.

It is true that the Act, if read literally, would exclude sales to municipalities,* but this case would appear to be a proper one for application of the accepted rule that "Where the plain meaning of words used in a statute produces an unreasonable result, 'plainly at variance with the policy of the legislation as a whole,' [this Court] may follow the purpose of the statute rather than the literal words. *United States* v. *American Trucking Associations*, 310 U. S. 534, 543, and cases cited." *United States* v. *Rosenblum Truck Lines*, 315 U. S. 50, 55.

Exemption of sales to municipalities would produce an unreasonable result, for, as the Commission stated in *Re Otter Tail Power Company*, 33 P. U. R. (NS) 257, 260, it would mean that "a

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* Section 201 (b) confers jurisdiction over "the sale of electric energy at wholesale in interstate commerce . . ." and Section 201 (d) defines the term "sale of electric energy at wholesale" as "a sale of electric energy to any person for resale." Section 3 (6) of the Act defines "person" as "an individual or a corporation" and "corporation" is defined in turn by Section 3 (3) as not including "'municipalities' as hereinafter defined." Municipality is defined in Section 3 (7) as a "political subdivision or agency of a State competent under the laws thereof to carry on the business of developing, transmitting, utilizing, or distributing power."

utility may not discriminate in rates charged private persons or corporations, but is at complete and unfettered liberty to indulge in the rankest discrimination as between municipalities, or as between private customers and municipalities, receiving the same service." It is hardly likely that Congress intended to deprive consumers served by the thousands of municipally owned distribution systems, of protection from unjust and unreasonable interstate rates. Such a result would be completely at variance with the basic purpose of the rate provisions of the Act, which were designed to "fill the gap" in rate regulation left by *Public Utilities Commission* v. *Attleboro Steam & Electric Company*, 273 U. S. 83. See *Jersey Central Power & Light Company* v. *Federal Power Commission*, 319 U. S. 61, 67–68, 71, 80–81." With this purpose even critics of the proposed legislation were in agreement."

" Superficially it might appear that "filling the gap" on sales to municipalities would be a futile thing with respect to the energy resold by municipalities at wholesale, since the resale of the energy is exempted from the Act. But sales of energy in interstate commerce by municipalities were recognized to be of rare occurrence; and in any event not for purposes of private profit, so as to fall within the normal ambit of rate regulation, Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), pp. 569, 570, 2061–2062; Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), p. 256.

" Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), pp. 647–48, 851, 1059, 1068, 1560–61, 1612, 1614, 1622, 1779; Hearings,

The definition of wholesale sales, in the bill passed by the Senate, did not exclude sales to municipalities." It was in the bill reported by the House that the present wording of Section 201 (d) first made its appearance, but the House report, in commenting on this definition, merely stated that "A wholesale transaction is defined to mean the sale of electric energy for resale * * *." H. Rep. No. 1318 (74th Cong., 1st Sess.), p. 8. Significantly, this restatement of the definition contained no reference whatsoever to "person"; and the report expressed no purpose that sales to municipalities were to be exempted. Where an exemption was intended, the report expressly stated so. Thus, immediately following the restatement of the definition of wholesale sales, the report added "and the Commission is given no jurisdiction over local rates even where the electric energy moves in interstate commerce." The fact that the House definition was generally intended to broaden the Senate definition which it superseded[21] lends additional support to the

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Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), pp. 348, 413, 478, 482, 511, 621, 729, 731, 739, 756–57, 768.

[21] The Senate definition (introduced into the bill by amendment from the Senate floor, 79 Cong. Rec. 8858) provided that "Electric energy shall be held to be sold at wholesale in interstate commerce within the meaning of this Part only when it is sold for resale after its transmission in interstate commerce or before such transmission if the same is thereafter so transmitted."

view that "person" was not used in a restrictive sense."

To construe Section 201 (f) as depriving municipalities of the protection accorded to private purchasers under the Act, would fail to give substantial effect to other provisions of the Act, e. g., Section 306, allowing a municipality to file a complaint on account of "anything done or omitted to be done by any licensee or public utility in contravention of the provisions of this Act,"[*] and Section 313 (a), permitting review of Commission orders at the behest of any "aggrieved" municipality.[*] As the Commission observed in

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[*] The Senate definition (see note 26, p. 22, *supra*) covered wholesale sales before and after interstate transmission, but omitted sales made in the course of such transmission, and would have made the Act inapplicable to the very sale which was involved in *Public Utilities Commission v. Attleboro Steam & Electric Co.*, 273 U. S. 83. The definition adopted by the House eliminated this defect.

[*] The Conference Committee adopted the House definition without comment. H. Rep. No. 1903 (74th Cong., 1st Sess.).

[*] Contrary to petitioner's assertion (Br. 35-36), the express reference in Section 306 to "licensee or public utility" establishes that the right of a municipality to complain extends to wrongs committed in contravention of Part II as well as Part I of the Act.

[*] It is true that the Senate Report conceived Section 201 (f)—then numbered 201 (e)—as also explaining the fact that the Commission was not authorized to "compel private utilities to establish connection or exchange power with public plants." S. Rep. No. 621 (74th Cong., 1st Sess.), p. 19. But this intention to exclude municipalities from the benefits of the interconnection provisions had been expressed often in the legislative history of the Act, and was

Re Otter Tail Power Company, supra, "Since the most serious, if not the only real complaint a municipality could have against a public utility would involve the rates charged it for electric energy at wholesale (the Commission has no power to regulate the retail rates of a public utility), it is most persuasive Congress intended that we have jurisdiction over such wholesale rates."

(2) Petitioner further contends that since the amount of energy which was transmitted to Fishers Island was approximately .2% of all the energy generated and received by petitioner, a rule of *de minimis* should prevent such sales from furnishing a basis for the Commission's jurisdiction. (Br. 57.) Petitioner ignores the fact that Fishers Island, Fort Wright, and a Coast Guard station, as well as a civilian population varying from 700 in the winter to 3,000 in the summer, were entirely dependent upon the energy generated by petitioner, and that a business grossing $60,000 annually was

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present in the bill as originally introduced by the Commission. Thus, in H. R. 5423 and S. 1725, the common carrier section (Sec. 202 (a)) and the section relating to extension of facilities (Sec. 202 (b)) each employed the word "person" for the purpose of withholding their benefits from municipalities; whereas, the term "person" significantly was not employed in the rate sections (Secs. 202 (b) and 206 (a)) of H. R. 5423 and S. 1725, which were made applicable to "any service" furnished by a public utility. Hearings, House Committee on Interstate and Foreign Commerce, on H. R. 5423 (74th Cong., 1st Sess.), pp. 395, 397–98, 532, 564; Hearings, Senate Committee on Interstate Commerce, on S. 1725 (74th Cong., 1st Sess.), p. 260.

done in the transmission and local distribution of that energy (Ex. 16, R. III, 1049–1050).

In any event, Section 201 (b) of the Act, defining the facilities subject to the jurisdiction of the Commission, does not contain any minimum requirement as to volume or amount. This is to be contrasted with Section 203 (a) which expressly exempts facilities of a value less than $50,000 from the requirement that disposal of facilities subject to the jurisdiction of the Commission be approved by the Commission. Cf. 49 U. S. C. 304 (a) (4a). Clearly, Congress knew how to impose a minimum requirement when it so intended, and its failure to provide one in Section 201 (b) shows that none was intended."

" Federal jurisdiction under the commerce clause is not dependent upon volume (*National Labor Relations Board* v. *Fainblatt*, 306 U. S. 601, 606; *Valvoline Oil Co.* v. *United States*, 308 U. S. 141, 147), or ratio to total business (*Public Utilities Commission* v. *Attleboro Steam & Electric Co.*, 273 U. S. 83, 90).

CONCLUSION

It is respectfully submitted that the decision below should be affirmed.

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DECEMBER 1944.

APPENDIX A

The pertinent provisions of the Federal Power Act of 1935 (49 Stat. 838, 16 U. S. C. 792 *et seq.*) are as follows:

SEC. 3. The words defined in this section shall have the following meanings for purposes of this Act, to wit:

* * * * *

(3) "corporation" means any corporation, joint-stock company, partnership, association, business trust, organized group of persons, whether incorporated or not, or a receiver or receivers, trustee or trustees of any of the foregoing. It shall not include "municipalities" as hereinafter defined;

(4) "person" means an individual or a corporation;

* * * * *

(7) "municipality" means a city, county, irrigation district, drainage district, or other political subdivision or agency of a State competent under the laws thereof to carry on the business of developing, transmitting, utilizing, or distributing power;

SEC. 201. (a) It is hereby declared that the business of transmitting and selling electric energy for ultimate distribution to the public is affected with a public interest, and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following and of that part of such business which consists of the transmission of electric energy in interstate commerce and the sale of such energy at wholesale in inter-

state commerce is necessary in the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.

(b) The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a State line. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.

(c) For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States.

(d) The term "sale of electric energy at wholesale" when used in this Part means a sale of electric energy to any person for resale.

(e) The term "public utility" when used in this Part or in the Part next following means any person who owns or operates facilities subject to the jurisdiction of the Commission under this Part.

(f) No provision in this Part shall apply to, or be deemed to include, the United States, a State or any political subdivision of a State, or any agency, authority, or instrumentality of any one or more of the foregoing, or any corporation which is wholly owned, directly or indirectly, by any one or more of the foregoing, or any officer, agent, or employee of any of the foregoing acting as such in the course of his official duty, unless such provision makes specific reference thereto.

SEC. 202. (a) For the purpose of assuring an abundant supply of electric energy throughout the United States with the greatest possible economy and with regard to the proper utilization and conservation of natural resources, the Commission is empowered and directed to divide the country into regional districts for the voluntary interconnection and coordination of facilities for the generation, transmission, and sale of electric energy, and it may at any time thereafter, upon its own motion or upon application, make such modifications thereof as in its judgment will promote the public interest. Each such district shall embrace an area which, in the judgment of the Commission, can economically be served by such interconnected and coordinated electric facilities. It shall be the duty of the Commission to promote and encourage such interconnection and coordination within each such district and between such districts. Before establishing any such district and fixing or modifying the boundaries thereof the Commission shall give notice to the State commission of each State situated wholly or in part within such district, and

shall afford each such State commission reasonable opportunity to present its views and recommendations, and shall receive and consider such views and recommendations.

(b) Whenever the Commission, upon application of any State commission or of any person engaged in the transmission or sale of electric energy, and after notice to each State commission and public utility affected and after opportunity for hearing, finds such action necessary or appropriate in the public interest it may by order direct a public utility (if the Commission finds that no undue burden will be placed upon such public utility thereby) to establish physical connection of its transmission facilities with the facilities of one or more other persons engaged in the transmission or sale of electric energy, to sell energy to or exchange energy with such persons: *Provided*, That the Commission shall have no authority to compel the enlargement of generating facilities for such purposes, nor to compel such public utility to sell or exchange energy when to do so would impair its ability to render adequate service to its customers. The Commission may prescribe the terms and conditions of the arrangement to be made between the persons affected by any such order, including the apportionment of cost between them and the compensation or reimbursement reasonably due to any of them.

* * * * * *

SEC. 203. (a) No public utility shall sell, lease, or otherwise dispose of the whole of its facilities subject to the jurisdiction of the Commission, or any part thereof of a value in excess of $50,000, or by any means whatsoever, directly or indirectly, merge or

consolidate such facilities or any part thereof with those of any other person, or purchase, acquire, or take any security of any other public utility, without first having secured an order of the Commission authorizing it to do so. Upon application for such approval the Commission shall give reasonable notice in writing to the Governor and State commission of each of the States in which the physical property affected, or any part thereof, is situated, and to such other persons as it may deem advisable. After notice and opportunity for hearing, if the Commission finds that the proposed disposition, consolidation, acquisition, or control will be consistent with the public interest, it shall approve the same.

* * * * *

SEC. 204. (a) No public utility shall issue any security, or assume any obligation or liability as guarantor, indorser, surety, or otherwise in respect of any security of another person, unless and until, and then only to the extent that, upon application by the public utility, the Commission by order authorizes such issue or assumption of liability. The Commission shall make such order only if it finds that such issue or assumption (a) is for some lawful object, within the corporate purposes of the applicant and compatible with the public interest, which is necessary or appropriate for or consistent with the proper performance by the applicant of service as a public utility and which will not impair its ability to perform that service, and (b) is reasonably necessary or appropriate for such purposes. The provisions of this section shall be effective six months after this Part takes effect.

(b) The Commission, after opportunity for hearing, may grant any application under this section in whole or in part, and with such modifications and upon such terms and conditions as it may find necessary or appropriate, and may from time to time, after opportunity for hearing and for good cause shown, make such supplemental orders in the premises as it may find necessary or appropriate, and may by any such supplemental order modify the provisions of any previous order as to the particular purposes, uses, and extent to which, or the conditions under which, any security so theretofore authorized or the proceeds thereof may be applied, subject always to the requirements of subsection (a) of this section.

* * * * *

(f) The provisions of this section shall not extend to a public utility organized and operating in a State under the laws of which its security issues are regulated by a State commission.

SEC. 205. (a) All rates and charges made, demanded, or received by any public utility for or in connection with the transmission or sale of electric energy subject to the jurisdiction of the Commission, and all rules and regulations affecting or pertaining to such rates or charges shall be just and reasonable, and any such rate or charge that is not just and reasonable is hereby declared to be unlawful.

* * * * *

SEC. 206. (a) Whenever the Commission, after a hearing had upon its own motion or upon complaint, shall find that any rate, charge, or classification, demanded, observed, charged, or collected by any public

utility for any transmission or sale subject to the jurisdiction of the Commission, or that any rule, regulation, practice, or contract affecting such rate, charge, or classification is unjust, unreasonable, unduly discriminatory or preferential, the Commission shall determine the just and reasonable rate, charge, classification, rule, regulation, practice, or contract to be thereafter observed and in force, and shall fix the same by order.

(b) The Commission upon its own motion, or upon the request of any State commission whenever it can do so without prejudice to the efficient and proper conduct of its affairs, may investigate and determine the cost of the production or transmission of electric energy by means of facilities under the jurisdiction of the Commission in cases where the Commission has no authority to establish a rate governing the sale of such energy.

SEC. 207. Whenever the Commission, upon complaint of a State commission, after notice to each State commission and public utility affected and after opportunity for hearing, shall find that any interstate service of any public utility is inadequate or insufficient, the Commission shall determine the proper, adequate, or sufficient service to be furnished, and shall fix the same by its order, rule, or regulation: *Provided*, That the Commission shall have no authority to compel the enlargement of generating facilities for such purposes, nor to compel the public utility to sell or exchange energy when to do so would impair its ability to render adequate service to its customers.

SEC. 208. (a) The Commission may investigate and ascertain the actual legitimate cost of the property of every public

utility, the depreciation therein, and, when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation, and the fair value of such property.

(b) Every public utility upon request shall file with the Commission an inventory of all or any part of its property and a statement of the original cost thereof, and shall keep the Commission informed regarding the cost of all additions, betterments, extensions, and new construction.

* * * * *

SECTION 301. (a) Every licensee and public utility shall make, keep, and preserve for such periods, such accounts, records of cost-accounting procedures, correspondence, memoranda, papers, books, and other records as the Commission may by rules and regulations prescribe as necessary or appropriate for purposes of the administration of this Act, including accounts, records, and memoranda of the generation, transmission, distribution, delivery, or sale of electric energy, the furnishing of services or facilities in connection therewith, and receipts and expenditures with respect to any of the foregoing: *Provided, however,* That nothing in this Act shall relieve any public utility from keeping any accounts, memoranda, or records which such public utility may be required to keep by or under authority of the laws of any State. The Commission may prescribe a system of accounts to be kept by licensees and public utilities and may classify such licensees and public utilities and prescribe a system of accounts for each class. The Commission, after notice and opportunity for hearing, may determine by order the accounts in which particular outlays and r ceipts

shall be entered, charged, or credited. The burden of proof to justify every accounting entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry, and the Commission may suspend a charge or credit pending submission of satisfactory proof in support thereof.

* * * * *

SEC. 307. (a) The Commission may investigate any facts, conditions, practices, or matters which it may find necessary or proper in order to determine whether any person has violated or is about to violate any provision of this Act or any rule, regulation, or order thereunder, or to aid in the enforcement of the provisions of this Act or in prescribing rules or regulations thereunder, or in obtaining information to serve as a basis for recommending further legislation concerning the matters to which this Act relates. The Commission may permit any person to file with it a statement in writing under oath or otherwise, as it shall determine, as to any or all facts and circumstances concerning a matter which may be the subject of investigation. The Commission, in its discretion, may publish or make available to State commissions information concerning any such subject.

* * * * *

SEC. 309. The Commission shall have power to perform any and all acts, and to prescribe, issue, make, amend, and rescind such orders, rules, and regulations as it may find necessary or appropriate to carry out the provisions of this Act. Among other things, such rules and regulations may define accounting, technical, and trade terms used in this Act; and may prescribe

the form or forms of all statements, declarations, applications, and reports to be filed with the Commission, the information which they shall contain, and the time within which they shall be filed. Unless a different date is specified therein, rules and regulations of the Commission shall be effective thirty days after publication in the manner which the Commission shall prescribe. Orders of the Commission shall be effective on the date and in the manner which the Commission shall prescribe. For the purposes of its rules and regulations, the Commission may classify persons and matters within its jurisdiction and prescribe different requirements for different classes of persons on matters. All rules and regulations of the Commission shall be filed with its secretary and shall be kept open in convenient form for public inspection and examination during reasonable hours.

SEC. 313. (a) Any person, State, municipality, or State commission aggrieved by an order issued by the Commission in a proceeding under this Act to which such person, State, municipality, or State commission is a party may apply for a rehearing within thirty days after the issuance of such order.

* * * * *

(b) Any party to a proceeding under this Act aggrieved by an order issued by the Commission in such proceeding may obtain a review of such order in the Circuit Court of Appeals of the United States for any circuit wherein the licensee or public utility to which the order relates is located or has its principal place of business, or in the United States Court of Appeals for the

District of Columbia, by filing in such court, within sixty days after the order of the Commission upon the application for rehearing, a written petition praying that the order of the Commission be modified or set aside in whole or in part. * * * The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive.

* * * * *

APPENDIX B

Electric Plant Accounts Instruction No. 16 of the Uniform System of Accounts, prescribed for public utilities and licensees subject to the provisions of the Federal Power Act (revised to December 31, 1936), provides as follows:

16. *Transmission and Distribution Plant.* For the purpose of this system of accounts:

A. "Transmission system" means: (1) All land, conversion structures, and equipment employed at a primary source of supply (i. e., generating station, or point of receipt in the case of purchased power) to change the voltage or frequency of electric energy for the purpose of its more efficient or convenient transmission; (2) all land, structures, lines, switching and conversion stations, high tension apparatus, and their control and protective equipment between a generating or receiving point and the entrance to a distribution center or wholesale point; and (3) all lines and equipment whose primary purpose is to augment, integrate, or tie together the sources of power supply.

B. "Distribution system" means all land, structures, conversion equipment, lines, line transformers, and other facilities employed between the primary source of supply (i. e., generating station, or point of receipt in the case of purchased power) and of delivery to customers, which are not includible in transmission system, as defined

in Paragraph A, whether or not such land, structures and facilities are operated as part of a transmission system or as part of a distribution system.

NOTE.—Stations which change the energy from transmission to distribution voltage shall be classified as distribution stations.

C. Where poles or towers support both transmission and distribution conductors, the poles, towers, anchors, guys, and rights-of-way shall be classified as transmission system. The conductors, cross arms, braces, grounds, tie-wire, insulators, etc., shall be classified as transmission or distribution facilities, according to the purpose for which used.

D. Where underground conduit contains both transmission and distribution conductors, the underground conduit and rights-of-way shall be classified as distribution system. The conductors shall be classified as transmission or distribution facilities according to the purpose for which used.

E. Land (other than rights-of-way) and structures used jointly for transmission and distribution purposes shall be classified as transmission or distribution according to the major use thereof.

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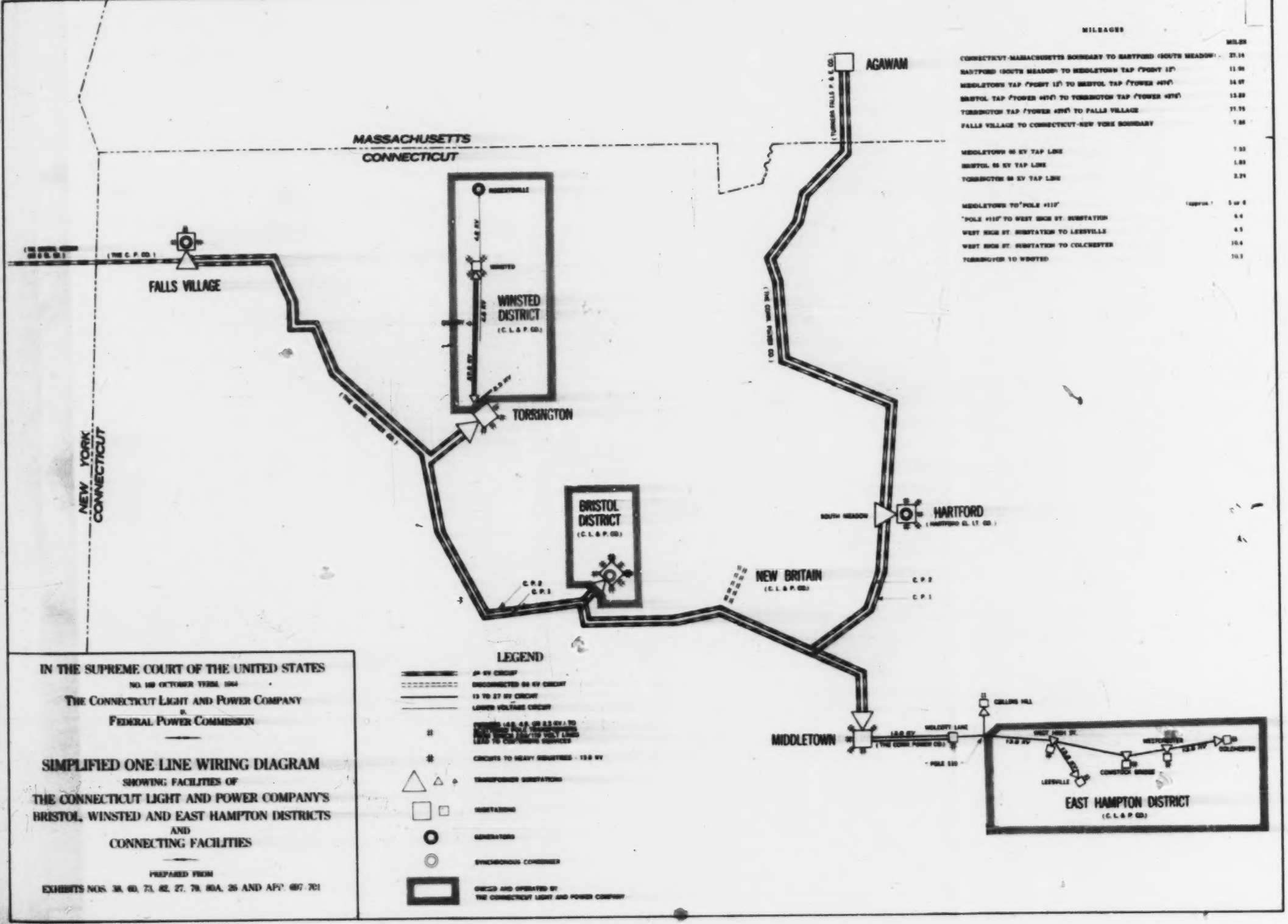


IN THE SUPREME COURT OF THE UNITED STATES

NO. 169 OCTOBER TERM, 1944

THE CONNECTICUT LIGHT AND POWER COMPANY

v.

FEDERAL POWER COMMISSION

SIMPLIFIED ONE LINE WIRING DIAGRAM

SHOWING FACILITIES OF

THE CONNECTICUT LIGHT AND POWER COMPANY'S

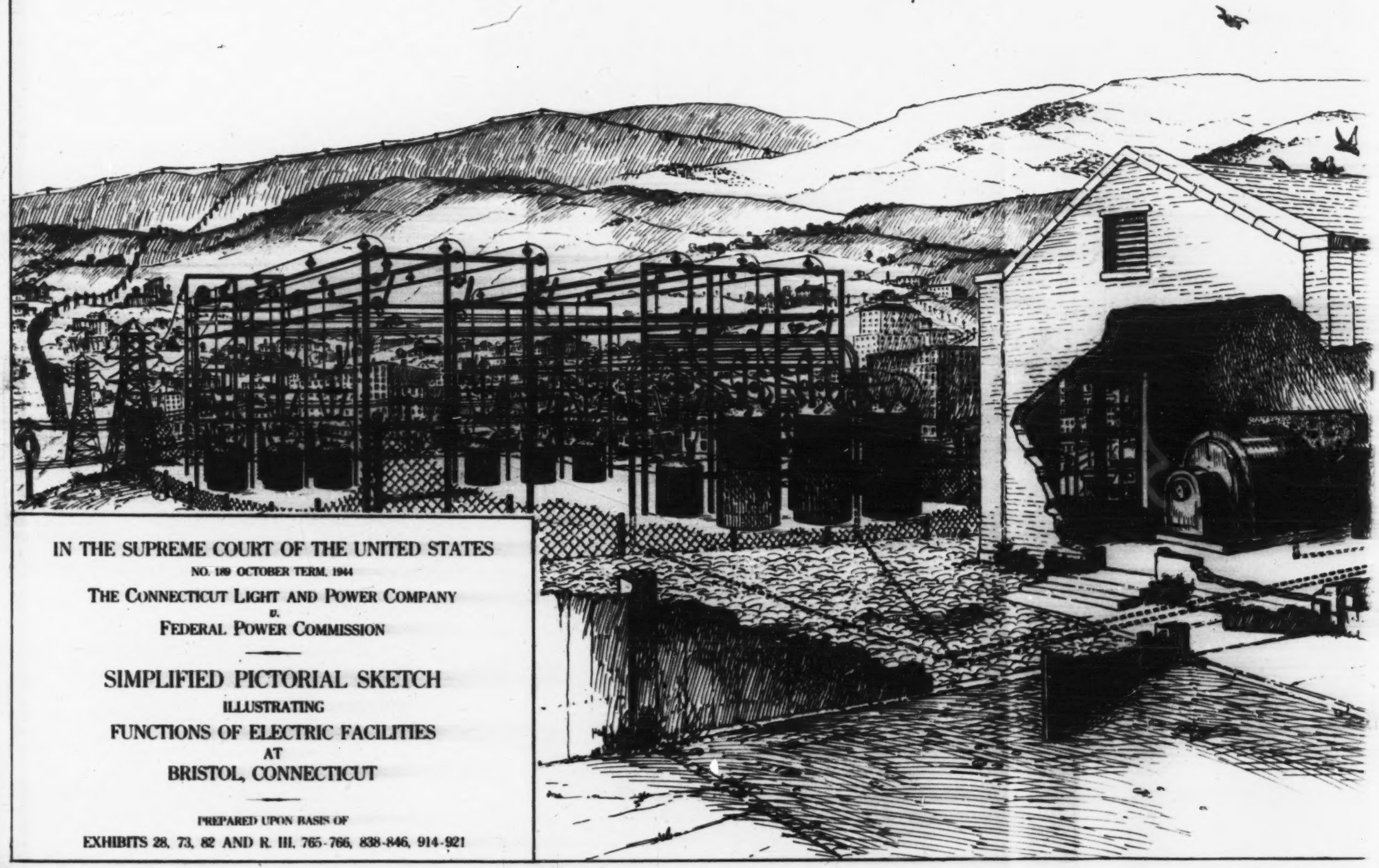
BRISTOL, WINSTED AND EAST HAMPTON DISTRICTS

AND

CONNECTING FACILITIES

PREPARED FROM

EXHIBITS NOS. 38, 60, 73, 82, 27, 70, 80A, 26 AND APP. 697-701



IN THE SUPREME COURT OF THE UNITED STATES

NO. 189 OCTOBER TERM, 1944

THE CONNECTICUT LIGHT AND POWER COMPANY

v.

FEDERAL POWER COMMISSION

SIMPLIFIED PICTORIAL SKETCH

ILLUSTRATING

FUNCTIONS OF ELECTRIC FACILITIES

AT

BRISTOL, CONNECTICUT

PREPARED UPON BASIS OF

EXHIBITS 28, 73, 82 AND R. III, 765-766, 838-846, 914-921

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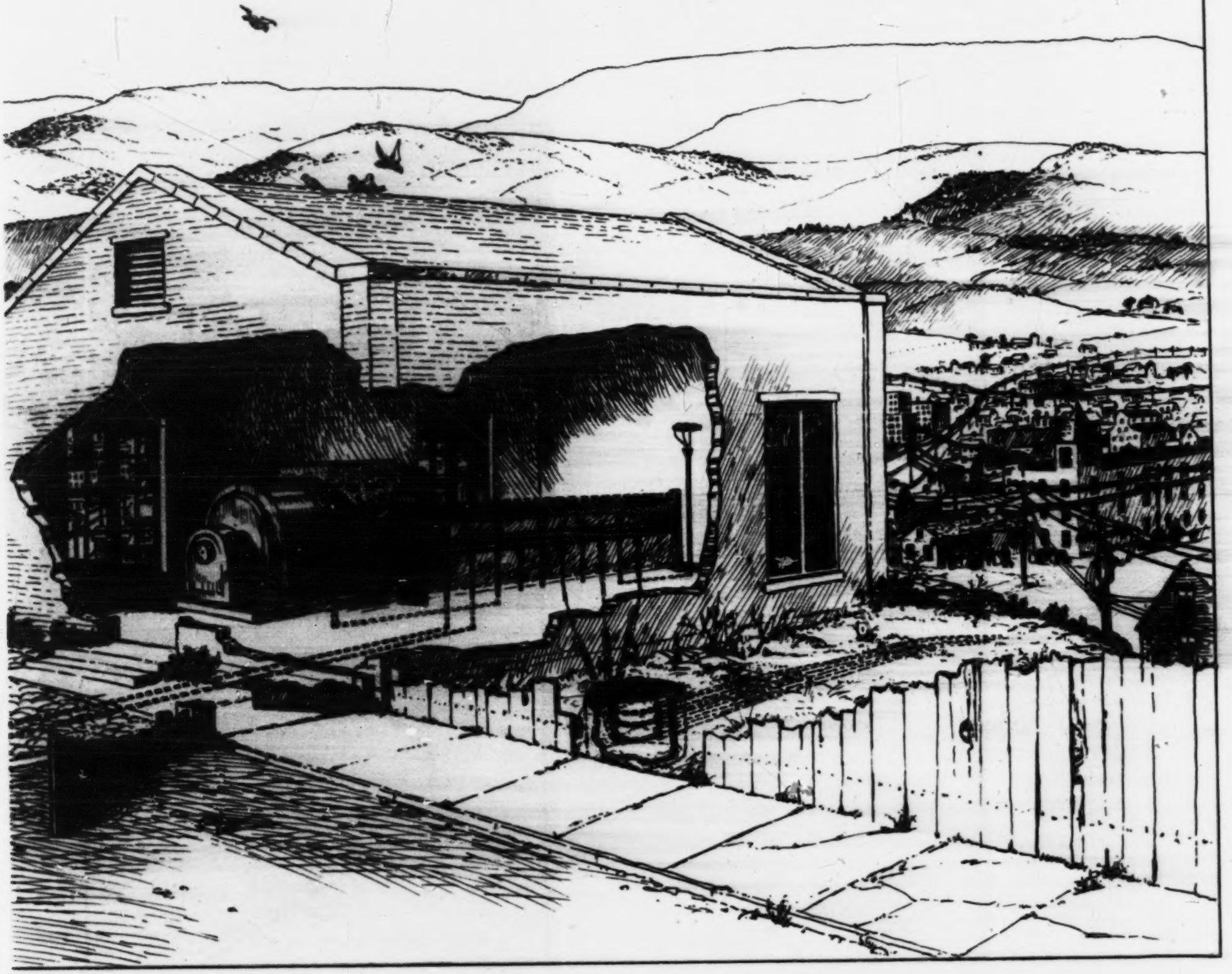

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No. 189

IN THE

Supreme Court of the United States

OCTOBER TERM, 1943

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION, *Respondent.*

BRIEF FILED ON BEHALF OF THE STATE OF CONNECTICUT, AS AMICUS CURIAE, IN SUPPORT OF THE PETITION FOR WRIT OF CERTIORARI.

FRANCIS A. PALLOTTI,
Attorney-General of the State of Connecticut,
State Capitol,
Hartford, Connecticut.

THE CASE, LOCKWOOD & BRAINARD CO.
HARTFORD, CONN.

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BRIEF FILED ON BEHALF OF THE STATE OF CONNECTICUT, AS AMICUS CURIAE, IN SUPPORT OF THE PETITION FOR WRIT OF CERTIORARI.

FOREWORD.

On May 29, 1935, prior to the enactment of the Federal Power Act, the State of Connecticut enacted additional statutory provisions for the regulation of local public utility companies, the purpose of which is stated therein as follows:

> "The general purposes of this Act are to assure to the State of Connecticut its full power to regulate its public service corporations, to increase the powers of the Public Utilities Commission, and to promote local control of the

NOTE: For convenience, The Connecticut Light & Power Company will be referred to in this brief as "the Company" and the Federal Power Commission will be referred to as "the Commission." The use of italics in quoted excerpts indicates emphasis supplied by the writers of this brief.

public service corporations of this State, and it shall be so construed as to effectuate these purposes." (Connecticut Public Acts of 1935, ch. 191.)

Section 6 of said Act (Cumulative Supplement (1935) §1414 (c), cl. f, p. 592) provides in part as follows:

> " . . . No gas, electric or water company, or holding company, or any official, board or commission purporting to act under any governmental authority other than that of this state or of its divisions, municipal corporations or courts, shall interfere with or attempt to interfere with or exercise authority or control over any gas, electric or water company incorporated by this state and engaged in the business of supplying service within this state, or with or over any holding company incorporated by this state and doing the principal part of its business within this state, without having first obtained the approval of the commission, except as the United States may properly regulate actual transactions in interstate commerce. Any action contrary to the provisions of this section shall be voidable on order of the commission."

In accordance with the policies thus expressed, the State of Connecticut joins in the application of the Company for a writ of certiorari to review the decision of the Court of Appeals for the District of Columbia, which decision affirmed a determination of the Federal Power Commission that the Company is a "public utility" within the jurisdiction of the Commission under the provisions of the Federal Power Act.

The State of Connecticut has a Public Utilities Commission which possesses jurisdiction over local

public utility companies and exercises many of the same regulatory powers with respect thereto which the Federal Power Commission is authorized to exercise over "public utilities" subject to its jurisdiction under the Federal Power Act. In view of the duality of regulation thus engendered, and because of the possibility that conflicts of decision may arise between the state and federal agencies, it is believed that the State of Connecticut possesses a vital interest in the important public questions involved in this case.

This case involves a local electric distributing company which purchases electric energy for the supply of a small isolated portion of its distributing system, the electric energy being supplied by another company, partly (the Commission has found) from sources outside of the State, and being received by the distributing company within the State for local retail distribution therein.

Congress, when it enacted the Federal Power Act, did not intend that the Federal Power Commission should possess regulatory powers with respect to such a company; on the contrary it was intended, under the provisions of the Act, that the State should possess exclusive jurisdiction to regulate such local distributing companies.

The State of Connecticut believes that the assertion by the Commission of current jurisdiction over the Company in the present case represents an unwarranted and illegal invasion of the powers of the State to regulate its local distributing companies, which powers were clearly intended to be preserved to the State under the provisions of the Federal Power Act.

The State of Connecticut therefore, files this brief as *amicus curiae* in support of the petition of the Company for writ of certiorari.

PRELIMINARY STATEMENT.

Under the provisions of the Federal Power Act, individuals or corporations occupying the status of a "public utility", as defined by the Act, are subject to broad regulatory powers of the Federal Power Commission over accounts and accounting; the use and sale of facilities; mergers and consolidations; the acquisition of securities of other "public utilities"; the ascertainment of cost and depreciation of properties; the filing of annual reports and other matters.

Whether individuals or corporations occupy the status of a "public utility" under the Act, depends upon whether they own or operate "facilities subject to the jurisdiction of the Commission" under Part II of the Act, whose provisions apply to "the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce." Under such provisions, the Commission is given jurisdiction "over all facilities for such transmission or sale of electric energy," but it is plainly stated therein that, except as specifically provided in Parts II and III of the Act, the Commission "shall not have jurisdiction . . . over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce."

On May 15, 1942, the Federal Power Commission determined that the Company "was", during various periods since the effective date of the Federal Power

Act, and *"continues to be"* a "public utility" under the Act, and made an order directing the Company to "comply" with the Commission's system of accounts and general accounting orders applicable to such a "public utility."

Determination as to present status. The determination of the Commission with respect to the present status of the Company, and the order directing current compliance with the accounting requirements, were founded upon the ownership and operation by the Company of certain facilities located in a substation at Bristol, Connecticut, by which the Company receives into its local electric system there, electric energy purchased by it from the Connecticut Power Company, an independent and unaffiliated corporation. Although not called for by the Company's arrangements with its vendor, such energy was found to include, at times, electric energy originating in the State of Massachusetts. The energy so received is sold and distributed by the Company at retail to local consumers in its Bristol district, wholly within the State of Connecticut.

Determination As To Past Status. Since the State of Connecticut is interested primarily in the Commission's claim to current general jurisdiction over the Company (i.e. at the time of the making of the Commission's determination) and since the Commission predicated such claim solely upon the ownership and operation by the Company of its facilities at Bristol, Connecticut, we shall not discuss herein the situations which existed prior to the hearing and determination of the Commission, with reference to the East Hampton, Torrington-Winsted, and Groton districts of the Company.

REFERENCE TO OPINIONS BELOW.

The findings, opinion and order of the Federal Power Commission are reported unofficially at 44 P.U.R. (N.S.) 170. The opinion of the Court of Appeals for the District of Columbia is reported at 141 F. (2d) 14.

THE QUESTIONS INVOLVED.

The question in which the State of Connecticut is interested is the following:

Whether, under the provisions of the Federal Power Act, a local *distributing* company, operating and *distributing* electric energy for local consumption wholly within the State, is a "public utility" subject to the broad regulatory powers of the Federal Power Commission, because such company owns or operates facilities by which it receives within the State, for local *retail distribution* therein, electric energy purchased from others, and a portion of such energy, through interconnections maintained by the vendors and over which the local company has no control, originates in another State.

STATEMENT OF THE CASE.

A. The Facts.

The principal facts of the case are set forth in the petition for certiorari filed by the Company and, for the sake of brevity, we shall not repeat them here except for a brief reference to the facilities upon which the Commission based its assertion of current jurisdiction over the Company and its accounts.

The facilities owned and operated by the Company which are used to receive electric energy for the supply

of its Bristol District, consist of a substation and appurtenances contained therein, which are connected with the Connecticut Power Company's high tension line in Bristol, Connecticut, all of which are used to receive electric energy from the high tension line; to lower the voltage thereof; and to eliminate fluctuation in the voltage, for local retail distribution of the energy to the Company's consumers in the Bristol District.

These were the *only* facilities owned and operated by the Company at the times of the hearing and determination of the Commission, through which electric energy from Massachusetts was found to pass at such times.

Other facts stated in the petition of the Company for writ of certiorari will be referred to in our argument.

B. The Determination of the Commission as to Present Status of the Company.

The Commission determined that the aforementioned facilities owned and operated by the Company at Bristol were "used for the transmission of electric energy . . . as distinguished from local distribution thereof," and that "from January 1, 1937 *to the present time,*" the Company "was *and continues to be*" a "public utility" under the Federal Power Act.

Thus, while the Commission, with reference to the Company's East Hampton, Torrington-Winsted and Groton Districts, determined that the Company "was" a "public utility" during specified periods ending prior to the hearing and determination, the Commission determined that the Company was and is presently under its jurisdiction by reason of the Company's present

ownership and operation of the facilities at Bristol. The Commission's finding No. 19 reads as follows (R. 69):

> "(19) From January 1, 1937, *to the present time* the Respondent has continuously owned and operated and *now owns and operates* facilities in Bristol, Connecticut, for the transmission of electric energy, transmitted from the State of Massachusetts and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were *and are* facilities for the transmission of electric energy in interstate commerce and Respondent was *and continues to be, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act.*"

In accordance with such determination, the order of the Commission purports to direct compliance with its system of accounts and various accounting orders up to the moment of its determination and in the future.* The Commission's order, dated May 15, 1942, which incorporates the Commission's findings as a part thereof, provides, in part:

> "(A) The Respondent is hereby required *to comply* with the aforesaid Order No. 42, order

* The Commission's intention to direct *current compliance* with its accounting orders and system of accounts is clear from its brief to the Court below. After referring to its findings based on the situation in petitioner's Bristol district, the Commission's brief stated:

> "On these findings there can be no doubt as to the *continuing* power of the Commission to require petitioner as a "public utility" to keep its accounts *henceforth* in accordance with the prescribed original cost accounting system *as directed by the order under review*, in addition to completing the original cost and reclassification studies." (Brief for Respondent in the Court below, p. 23).

of May 11, 1937, and the other orders supplemental to said Order No. 42; and *to comply* with the accounting requirements prescribed thereby, *applicable to it as a public utility* within the meaning of that term as used in that act, as of the effective dates of such orders."

C. The Decision of the Court Below.

The Court of Appeals held that the Company "*is* a public utility under the Act," without reference to the question of whether its status may have changed since the effective date of the Act.

The Court did not rest its decision, with reference to the Company's *receipts* of electric energy originating outside of the State of Connecticut, upon the findings of the Federal Power Commission that facilities owned and operated by the Company "were facilities for the transmission of electric energy . . . as distinguished from local distribution thereof." Despite the specific exemptions of various facilities from the jurisdiction of the Commission, as contained in section 201 (b) of the Federal Power Act, including "facilities used in local distribution or only for the transmission of electric energy in intrastate commerce," the Court held that the distinction made in the findings of the Commission was unimportant. Thus, the Court said:

> "Therefore, whether or not the facilities by which petitioner *distributes* energy from Massachusetts should be classified as 'local' *is not relevant to this case.* The sole test of jurisdiction of the Commission *over accounts* is whether these facilities, *'local' or otherwise,* are used for the transmission of electric energy from a point in one state to a point in another."

The Court's decision will be discussed further in our argument.

REASONS FOR GRANTING THE WRIT.

The questions presented here, relating to the receipt and local distribution of electric energy within a state, by a local distributing company, were not involved in *Jersey Central Co. v. Federal Power Commission* (319 U. S. 61) nor in *Hartford Electric Light Co. v. Federal Power Commission* (131 F. 2d 953, certiorari denied 319 U. S. 741) where the utility companies before the Courts were generating or transmitting electric energy which *subsequently* crossed a state line and was consumed in another state.

The decision below, unless reviewed and reversed, would open up a vast new field of jurisdiction for the Federal Power Commission, i.e. over local distributing companies which are fully subject to state regulation, simply because electric energy which they purchase from others may include energy originating in another state. The Court below failed to recognize that no purpose intended by the Federal Power Act would be served by the exercise of such Federal jurisdiction since wholesale rates for interstate sales of such electric energy are subject to regulation by the Federal Power Commission, and the retail rates charged by such distributing companies are subject to regulation by the state commissions.

In determining, under such circumstances, that the Company is a "public utility" within the meaning of the Federal Power Act, the Court below misconstrued the provisions of the Federal Power Act in such fashion

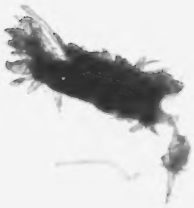
as to nullify the same. The decision, unless reviewed and reversed by this Court, will affect the numerous similar situations existing in all parts of the United States and will seriously prejudice the rights of the States to exercise powers of regulation over utility companies which were intended to be preserved to them by the provisions of the Federal Power Act.

The result of the decision of the Court below is to place under the supervision of the Commission all of the matters which fall within its regulatory powers over a "public utility" under the Federal Power Act, including, among others, the establishing of interconnections with other "public utilities" for sale to or exchange of energy with them (§202); supervision over mergers and consolidations, as well as over the purchase of securities of another "public utility" (§203); the ascertainment of the cost of the company's property and the depreciation existing therein (§208); the prescribing of systems of accounts and the supervision of the keeping of the accounts of the company (§301); supervision over the depreciation accounting of the company and the methods of accruing depreciation therein (§302); and the filing of annual reports (§304).

The petition of the Company states that, according to a survey made by the Edison Electric Institute, there are over 1,000 local electric distributing companies located in 46 States of the United States, which purchase power from larger power systems, the power supply of almost all of which has some component from an interstate source. Doubtless there are numerous situations throughout the country which are similar to the situation of the Company here at Bristol. Under the decision below, all such companies similarly situated

would be subject to the general jurisdiction of the Commission with respect to the aforesaid matters.

The decision below therefore, is one of widespread application throughout the United States and is of great importance to the various States and their citizens. The questions presented in this case, involving the construction of a federal statute, have not been presented to this Court in any other case, either upon the merits or upon petition for certiorari, and should be reviewed pursuant to the present application of the Company.



ARGUMENT.

POINT I.

THE COMPANY IS NOT A "PUBLIC UTILITY" UNDER THE ACT, BY REASON OF THE SOLE REMAINING INTERSTATE CONNECTION AT BRISTOL, I.E., AT THE TIME THE COMMISSION MADE ITS DETERMINATION.

A. IT IS NOT THE PURPOSE OF THE FEDERAL POWER ACT TO REGULATE LOCAL DISTRIBUTING COMPANIES WHICH MAY RECEIVE AND DISTRIBUTE, WITHIN THE STATE, ELECTRIC ENERGY ORIGINATING IN ANOTHER STATE.

In the *Jersey Central* case, supra, both the majority and minority opinions in this Court pointed out that the Federal Power Act was designed to fill the hiatus in regulation, in respect to interstate sales of electric energy *at wholesale*, left by the decision in *Public Utilities Commission v. Attleboro Steam & Electric Co.* (273 U. S. 83).

> *Jersey Central Power & Light Co. v. Federal Power Commission*, 319 U. S. 61, 67, 68, 70, 71, 86.

Compare:

> *Public Utilities Commission v. Landon*, 249 U. S. 236;
> *Missouri v. Kansas Gas Co.*, 265 U. S. 298.

The majority of the Court in the *Jersey Central* case said:

> "The primary purpose of Title II, Part II, of the 1935 amendments to the Federal Power Act . . . was to give a federal agency power *to regulate the sale of electric energy across state lines*. Regulation of such sales had been denied to the states by *Public Utilities Commission v.*

> *Attleboro Steam Co.*, 273 U. S. 83. On account of the development of interstate sales of electric energy, it was deemed desirable by Congress to enter this field of regulation." (*Jersey Central Power and Light Co., v. Federal Power Commission*, 319 U. S. 61, 67-8.)

The purpose thus expressed is disclosed, in part, by the declaration of policy appearing in Section 201 (a) of the Act (49 Stat. 847, 16 U. S. C. A. §824 (a), as follows:

> "(a) It is hereby declared that the business of *transmitting and selling* electric energy for *ultimate* distribution to the public is affected with a public interest, and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following and of that part of such business which consists of the transmission of electric energy *in interstate commerce* and the sale of such energy *at wholesale in interstate commerce* is necessary in the public interest, such *Federal regulation, however, to extend only to those matters which are not subject to regulation by the States.*"

In the *Jersey Central* case, *supra*, this Court held that where a New Jersey electric company generated and sold electric energy to a second company in the State of New Jersey, and a portion of such energy found its way into the State of New York (through a connection maintained by the purchaser with a third company serving ultimate consumers in New York), an electric line owned and operated by the first company, by which the energy was delivered to the second company, was a facility for "the transmission of electric energy in interstate commerce," and that the first company was a "public utility" under the Act. In

holding that the Act did not contemplate the exercise of jurisdiction only where a company owns facilities which *cross* a state line, the Court again pointed to the purpose of the Act as follows:

> "The purpose of this act was primarily to *regulate the rates and charges of the interstate energy.* If *intervening companies* might purchase *from producers in the state of production,* free of federal control, *cost would be fixed prior to the incidence of federal regulation* and federal rate control would be substantially impaired, if not rendered futile." (*Jersey Central Power & Light Co. v. Federal Power Commission,* 319 U. S. 61, 71-2).

Bearing in mind the "primary purposes" of the Federal Power Act, i.e., to exercise control which had not previously been exercised by Congress over interstate sales of electric energy at *wholesale* (which control could not be exercised by the states) and at the same time to preserve to the states their existing powers to regulate intrastate utility companies and their local sales at retail, it is apparent that the Commission's assertion of jurisdiction in the present case is not in accord with such purposes.

The Company does not generate electric energy which is sold at wholesale in interstate commerce (*Hartford Electric Light Co. v. Federal Power Commission,* 131 F. 2d 953, certiorari denied, 319 U. S. 741); nor does the Company transmit electric energy which is resold at wholesale and ultimately consumed in another state (*Jersey Central Power & Light Co. v. Federal Power Commission,* 319 U. S. 61). Instead of generating or transmitting, in the State of Connecticut, electric energy which is ultimately consumed outside of the State, the Company here *receives* energy

within Connecticut *for local distribution and retail sale to consumers within the State.*

What purpose would be served by federal regulation in such a case? Before the Company receives the energy and distributes the same to its consumers within the State, the Federal Power Commission presumably has *already* exercised its function of regulating the company or companies which produced the energy in Massachusetts and transmitted the same to and across the State line into Connecticut, including the regulation of wholesale rates subject to the Commission's jurisdiction. This is not a situation where "cost would be fixed prior to the incidence of federal regulation", as was said in the *Jersey Central* case, *supra.* When the Company receives the energy at Bristol, the "incidence of federal regulation" has not only been reached but *passed.* In the interstate sale of the energy, the cost has already been fixed by the Commission. Thenceforth no interstate transactions take place and no federal rate control is involved. The company's costs are subject to the supervision of the State of Connecticut for the purpose of regulating the intrastate retail rates.

Under the present order of the Commission, the Company would be required to install the system of accounts prescribed by the Commission, and to follow the same with respect to all of its transactions in the State of Connecticut, and also to file inventories and original cost studies with respect to all of its property in the State of Connecticut. Under the determination that the Company is a "public utility", the Commission would possess many other regulatory powers over the Company, as noted elsewhere herein.

We submit that none of these far reaching results, which would flow from the occupation of the status of a "public utility" under the Act, were intended by Congress to apply to an intrastate distributing company simply because electric energy which it purchases for the supply of a small isolated portion of its electric system may sometimes originate in another state.

We submit further that, viewed against the background of its history* and very evident purposes, the Act cannot properly be construed to place the Company under the jurisdiction of the Commission in the present circumstances.

B. THE COMPANY DID NOT OWN OR OPERATE FACILITIES SUBJECT TO THE JURISDICTION OF THE COMMISSION AT THE TIME THE COMMISSION MADE ITS DETERMINATION.

The Commission's authority to prescribe and order compliance with a system of accounts, is contained in section 301 of Part III of the Federal Power Act (49 Stat. 854, 16 U. S. C. A. §825) which, by its terms, applies only to "every licensee and *public utility.*" Since the Company is not a "licensee" under Part I of the Act, the Commission's authority to make the order under review in this proceeding, can exist only if the Company is a "public utility" within the meaning of the Act.

Jersey Central Power & Light Co. v. Federal Power Commission, 319 U. S. 61, 67, note 6.

*For a discussion of the legislative history and juridicial background of the Federal Power Act, see the majority and minority opinions in *Jersey Central Power & Light Co. v. Federal Power Commission*, 319 U. S. 61.

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A "public utility" is defined in Section 201 (e) of Part II of the Act (49 Stat. 847, 16 U. S. C. A. §824 (e)), as follows:

> "(e) The term 'public utility' when used in this Part *or in the Part next following* means any person who owns or operates facilities subject to the jurisdiction of the Commission *under this Part.*"

The facilities which are subject to the jurisdiction of the Commission (and those which are not) are specified in subsection (b) of section 201, which governs the application of Part II of the Act and provides as follows:

> "(b) The provisions of this Part shall apply *to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy* or deprive a state or state commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted acro s a State line. *The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction,* except as *specifically provided* in this Part and the Part next following, over facilities used for the generation of electric energy *or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce,* or over facilities for the transmission of electric energy consumed wholly by the transmitter."

The ultimate question in this case, therefore, is whether the facilities owned and operated by the Company at Bristol are subject to the jurisdiction of

the Commission under the foregoing provisions. We submit that they are not, for the following reasons.

1. *The Company does not own or operate facilities for the transmission or sale of electric energy at wholesale in interstate commerce.*

The Company does not sell electric energy "at wholesale in interstate commerce." In fact, it does not sell energy at wholesale at all in its Bristol district. The electric energy which is purchased from the Connecticut Power Company, and received at Bristol, is distributed to local consumers at retail.

Apart from the specific exemptions of certain facilities from the jurisdiction of the Commission (e.g. facilities used in local distribution) the question presented here, as in the Jersey Central case, is whether the Company owns or operates facilities "for the transmission of electric energy in interstate commerce," and that phrase must be construed with reference to the background and purposes of the Act.

Jersey Central Power & Light Co. v. Federal Power Commission, 319 U. S. 61.

Under traditional concepts of "interstate commerce", this Court had held, prior to enactment of the Federal Power Act, that the receipt within a state, by a local distributing company, of natural gas originating in another state, and its sale and delivery to local consumers at retail, does not constitute "any part of interstate commerce".

Public Utilities Commission v. Landon, 249 U. S. 236, 245.
Missouri v. Kansas Gas Co., 265 U. S. 298.
See also:

East Ohio Gas Co. v. Tax Commission, 283 U. S. 465, 471-2;
Illinois Gas Co. v. Public Service Co., 314 U. S. 498, 504.

In *Public Utilities Commission v. Landon*, (249 U. S. 236, 245) the Court held that although the piping of natural gas from state to state, and its delivery to independent local gas companies, is interstate commerce, the receipt of the gas and its retailing and delivery by the local companies to their consumers is wholly intrastate commerce and not a continuation of interstate commerce, even though the mains of the local companies were permanently connected to those of their vendors.

Did the Congress, in enacting the Federal Power Act, intend to do violence to such existing concepts of what is and what is not a "transmission in interstate commerce?" We submit that the background and legislative history of the Act indicate very clearly that it did not. The Act purports to regulate what Congress had not previously regulated—the sale of electric energy *at wholesale* in interstate commerce; that was its "primary purpose."

Jersey Central Power & Light Co. v. Federal Power Commission, 319 U. S. 61, 67.

Under the declaration of policy contained in section 201 (a) of the Act, the business which Congress deemed affected with a public interest was that of "*transmitting and selling* electric energy for *ultimate* distribution to the public," i.e. a transmission or sale at wholesale, as distinguished from sales and deliveries of electric energy at retail to local consumers. This thought is further expressed later in the same subsection, in the statement that Federal regulation is necessary in the public interest with respect to "that part of such business which consists of the transmission of electric energy in interstate commerce *and the sale of such energy at wholesale in interstate commerce.*" The same juxtaposition of the phrases relating to "transmission" and "sale" continues in section 201 (b).

The significance of the phraseology used in section 201 (a) and (b) of the Act was specifically recognized by this Court in the *Jersey Central* case, *supra*, where the Court paraphrased the statute by relating the word "transmission" to the words "at wholesale." Referring to section 201 (b), the Court said:

> "Subsection (b) declares that the provisions of this part apply '*to the transmission of electric energy at wholesale* in interstate commerce.' This subsection gives jurisdiction over facilities used for *such transmission*. . . . The determinative fact is the ownership of facilities used in transmission. Such use makes the owner or operator of such facilities a public utility under the act (e)." (*Jersey Central Power & Light Co. v. Federal Power Commission*, 319 U. S. 61, 72-73.)

In the *Jersey Central* case, *supra*, the Court was dealing with a situation where it could be said (in view

of the prior decisions of the Court that a sale at wholesale of electric energy which later crosses state lines is a transaction "in interstate commerce") that a transmission and sale at wholesale within the state, with *subsequent* resale at wholesale and transmission out of the state, was a "*transmission* in interstate commerce." Thus, the Court referred to the cases of *Public Utilities Commission v. Attleboro Steam & Electric Co.* (273 U. S. 83) and *Illinois Gas Co. v. Public Service Co.* (314 U. S. 498), both of which involved the sale of interstate electric energy or gas *at wholesale*, as follows:

> "Without this separation from the movement across the New Jersey-New York line, *the transmission by Jersey Central would fall within the definition of commerce declared by two former decisions of this Court.*
>
> "In *Public Utilities Commission v. Attleboro Steam Co.*, 273 U. S. 83, 86, this Court held *in interstate commerce* the sale of locally produced electric current at the state boundary with knowledge that the buyer would utilize the energy extrastate. The passage of custody and title at the line was held immaterial. *We see no distinction between a sale at or before reaching the state line.*" (*Jersey Central Co. v. Federal Power Commission*, 319 U. S. 61, 69).

Such reasoning can have no application to the present situation. The Company here is a local distributing company, engaged in a business which does not constitute "any part of interstate commerce," either in the sale of energy at retail for local consumption or in the delivery or distribution of such energy from the point of reception within the State to the local consumers. Under the Federal Power Act, the Company's rates to consumers are subject to exclusive regulation

by the State of Connecticut and it makes no sales of energy which would be subject to the jurisdiction of the Commission. No Federal purpose expressed in or intended by the Act would be served by placing such a local distributing company or any of its facilities under the jurisdiction of the Commission.

We submit that, in view of the background and purposes of the Act, it cannot be said that Congress intended to depart from the concepts of "interstate commerce" laid down in the prior decisions of this Court, so as to include in the phrase "facilities for the transmission of electric energy in interstate commerce," the facilities of a local distributing company used to receive and deliver energy at retail for local consumption within the state.

2. *The Company's facilities at Bristol are "facilities used in local distribution," over which the Commission has no jurisdiction.*

Moreover, whether or not the Company's facilities at Bristol, Connecticut, are to be considered as utilized for the "transmission of electric energy in interstate commerce," the Act specifically excludes them from the jurisdiction of the Commission.

So that there could be no possibility of mistaking its intention, Congress did not stop with defining the facilities over which the Commission has jurisdiction; it went a step further and defined the "facilities" over which the Commission "shall *not* have jurisdiction, except as *specifically* provided in this Part and the Part next following," i.e. Parts II and III of the Act. (Section 201 (b).) Among these exclusions from the jurisdiction of the Commission are "*facilities used in local distribution.*"

In view of the manifest purposes of the Act as previously outlined herein, and as referred to by this Court in the *Jersey Central* case, *supra*, there can be no question that the substation facilities owned and operated by the Company at Bristol are "facilities used in local distribution." They are not used to transmit—send across—electric energy for "*ultimate* distribution to the public" (section 201 (a)); they are not used for the "transmission of electric energy at wholesale" in interstate commerce (*Jersey Central* case, *supra*); they are used to distribute the energy received at the high tension line of the Connecticut Power Company in Bristol, Connecticut, directly to the local retail consumers in the Bristol district.

The Commission took the view that Congress intended to include within the scope of "facilities" used for "the transmission of electric energy in interstate commerce", all facilities:

> "from the generator, where generation is complete, to the point where the function of conveyance in bulk over a distance, which is the essential characteristic of 'transmission' is completed and the process of subdividing the energy to serve ultimate consumers, which is the characteristic of 'local distribution,' is begun." (Opinion of Commission, R75.)

The Commission, therefore, included within its description of "transmission facilities," the substation facilities used by this local distributing company to lower the voltage of the electric energy received at Bristol, and various devices used for handling the electric energy there, after the energy is received from the line of the Connecticut Power Company.

We submit that Congress intended no such narrow

and technical construction of the provisions of the Federal Power Act, so as to bring under the jurisdiction of the Commission a local distributing company because it owns and operates facilities whose function is not to "transmit" electric energy from point to point, but merely to receive the energy within the State and to lower the voltage and otherwise provide for the proper handling thereof, *at the point of reception,* for local distribution to retail consumers.

The Court below did not follow the Commission's reasoning. Instead it held that because the Commission is authorized to regulate the accounts of a "public utility" under Part III of the Act, and because such accounts may cover properties which constitute "facilities used in local distribution," there is specific provision in the Act for the regulation of such facilities by the Commission. The Court founded its decision upon the exception to the so-called "but" clause contained in section 201 (b), viz: "but shall not have jurisdiction, *except as specifically provided in this Part or the Part next following. . . .*" Thus the Court, referring to certain of Judge Frank's statements in *Hartford Electric Light Company v. Federal Power Commission* (131 F. 2d 953), said:

> "He reaches what seems to us the proper conclusion that section 201 (b) means to give the Commission jurisdiction over any facility for the transmission of electric energy in interstate commerce. The 'but' clause in the section is intended to make it clear that this jurisdiction extends even to local facilities *where the Act provides for their regulation, as it does in the case of accounting practices.*"

The fallacy of this reasoning is apparent. The Commission has no jurisdiction over the *accounts* of a

company *unless it is a "public utility."* Whether a company is a "public utility" depends upon whether the Commission has jurisdiction over "facilities" which it owns or operates. To say that the Commission has jurisdiction over facilities because it may regulate *accounts* for such facilities, which it may do only *if* the company *is* a "public utility," begs the question and tests the status of the company solely by reference to the results which would flow from that status if occupied by the company.

Moreover, the Court below seems to have completely overlooked the fact that under section 201 (e) of the Act, the test of whether a person is a "public utility" is whether it owns or operates "facilities subject to the jurisdiction of the Commission *under this Part*" i.e. under Part II of the Act. *The accounting provisions are contained in Part III of the Act* (§301). Obviously it was not intended that the status of "public utility" should be determined by reference to the accounting provisions contained in Part III, which are applicable only to one who is a "public utility" under the tests prescribed in Part II of the Act.

Indeed, the Court below does not seem to have considered the totality of the effect of its determination of the Company's status, with respect to the entire scope of the Commission's regulatory power over one who is a "public utility". The Court speaks as though all that were involved in the determination of status is the matter of accounting practices. Thus, referring to the construction urged by petitioner, the Court said:

> "Such a construction is a grammatical possibility. However, it contradicts the broad purpose of the Act to correct abuses of *write-ups, inflation of accounts and similar practices* which

> have on occasion been found in the utility industry. . . . It would encourage the setting up of unnecessarily complicated *accounting systems* between the owners of the segments of the artifically divided power system, which the Act is designed to eliminate."

This case does not involve an "artifically divided power system." The Company here is not affiliated in any way with the Connecticut Power Company, from which it purchases electric energy. It is a wholly independent distributing company, purchasing energy at arms-length from a stranger.

If the Federal Power Act leaves the door open to hypothetical corporate manipulations like those described in the opinion of the Court below, it does not follow that regulation may be evaded. The Federal Power Commission possesses jurisdiction over any company owning or operating facilities for the "transmission of electric energy at wholesale in interstate commerce." The state commissions have jurisdictions over companies operating local distribution systems, and that jurisdiction was intended to be preserved to them by the Federal Power Act.

If opportunity exists for corporate reorganizations which will divide an "interstate company" into segments i.e., two companies, one conducting the business of transmission and selling energy at wholesale, and the other conducting the business of local retail distribution, regulation may be *divided* but it *exists* and presumably will be exercised. If such a situation requires correction, there are means of correcting it other than misconstruing the plain provisions of the Federal Power Act.

3. *The Company's facilities at Bristol are used "only for the transmission of electric energy in intrastate commerce" within the meaning of the Act, and are excluded from the jurisdiction of the Commission.*

Apart from the question of whether the Company's facilities at Bristol are "used in local distribution," they also fall within the description of another class of facilities specifically excluded from the jurisdiction of the Commission, viz: those used "only for the *transmission* of electric energy *in intrastate commerce.*"

We have already shown that under the prior decision of this Court, the interstate journey of the electric energy ceases with its receipt by the Company at Bristol. Any "transmission" of the energy from the point of such receipt by a local distributing company is wholly "in intrastate commerce", and is not "in interstate commerce" within the ordinary meaning of such terms.

The phrase "transmission of electric energy in intrastate commerce" is not defined in the Act. However section 201 (c) provides as follows:

> "(c) For the purpose of this Part, electric energy *shall be held* to be transmitted in interstate commerce if *transmitted from* a state *and consumed at any point outside thereof;* but only insofar as such transmission takes place within the United States."

If this subsection were to be construed so as to stamp as facilities for "transmission in interstate commerce" *all* of the electrical facilities for the conveyance of electric energy from the point of generation in one state to the point of consumption in another state, then, of course, the Court below would be right, and all

facilities, including those "used in local distribution" —down to the electric bulb in a housewife's kitchen— would be subject to the jurisdiction of the Commission.

This, however, would completely nullify the "but" clause. Certainly, if no electric energy from another state flows through the facilities enumerated in the "but" clause, the exemptions contained therein would be wholly superfluous. That the Congress intended the exemptions to apply even though such energy flows through the facilities is plain. For example, there would be no point in exempting "facilities for the transmission of electric energy consumed wholly by the transmitter," unless the clause applies where the energy is produced in one state and consumed in another. Nevertheless, under the construction applied by the Court below, if electric energy from another state flows through any of the facilities enumerated, they would automatically become facilties for "transmitting electric energy in interstate commerce" and the owner or operator thereof would be a "public utility" under the Act.

We submit that Congress intended no such test of the Commission's jurisdiction, but that it clearly intended to exclude from jurisdiction the facilities which it specified as not being under the jurisdiction of the Commission, even though energy originating in another State may occasionally flow through them, including facilities "used only for the transmission of electric energy in intrastate commerce."

CONCLUSION.

Under a proper construction of the various provisions of the Federal Power Act discussed herein, the Company did not own or operate, at the times of the Commission's hearing and determination, any "facilities subject to the jurisdiction of the Commission" under Part II of the Act. The Company, therefore, was not a "public utility" under the Act at such times, and the Commission's order directing current compliance with its system of accounts and general accounting orders, was in excess of its jurisdiction and should have been set aside, in whole or in part, by the Court below.

In these circumstances the assertion and exercise of purported jurisdiction over the Company is not only illegal, but would unecessarily interfere with the power of the State to regulate local distributing companies.

The Company, under the decision below, would not only be required to comply with the accounting requirements of the Public Utilities Commission of the State of Connecticut, but also with those of the Federal Power Commission. In the case of conflicts of decision between the two regulatory bodies as to specific items in the accounts, the Company would be required to comply with both decisions.

If the Commission continues to assert general jurisdiction over the Company, as it undoubtedly will, many other possibilities of conflict will be present as to matters where dual regulation is involved. For example, the Company might seek and obtain the approval of the State Commission to the acquisition of securities of a company which is a "public utility" under the

Act. The Federal Power Commission would again assert jurisdiction, (Cf. *Jersey Central Power & Light Co. v. Federal Power Commission* 319 U. S. 61.) and it might deny its approval to the acquisition. The same possibility of conflicts would exist with respect to all other matters as to which the Federal Power Commission exercises regulatory power under the Federal Power Act. The nullification of the power of the State to regulate the business of the Company in such circumstances is apparent.

Such interference with the regulatory powers of the States may be a necessary concomitant where it is required in order to carry out the purposes of the Federal Power Act. Where no purpose of the Federal Power Act is to be served, such interference is unwarranted.

If it be true that one of the purposes of the Federal Power Act, as stated by the Court below, is "to correct abuses of write-ups, inflation of accounts and similar practices which have on occasion been found in the utility industry," such purpose obviously could exist only with respect to companies over which federal control is imposed. Certainly it was not the intention of Congress to correct such "abuses" with respect to local distributing companies whose supervision lies exclusively with the States under the provisions of the Act. If such "abuses" exist in such companies, the States possess plenary powers for their correction and it is no concern of the Federal Power Commission.

THE STATE OF CONNECTICUT JOINS THE COMPANY IN REQUESTING THAT THE WRIT BE GRANTED, TO THE END THAT THE COURT MAY HOLD THAT THE COMPANY AS A WHOLLY INTRASTATE DIS-

TRIBUTING COMPANY, ENGAGED IN THE BUSINESS OF SELLING AND DISTRIBUTING ELECTRIC ENERGY FOR LOCAL CONSUMPTION IN CONNECTICUT, IS NOT A "PUBLIC UTILITY" UNDER THE JURISDICTION OF THE FEDERAL POWER COMMISSION.

Respectfully submitted,

FRANCIS A. PALLOTTI,
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No. 189

IN THE

Supreme Court of the United States

OCTOBER TERM, 1943

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

BRIEF FILED ON BEHALF OF THE STATE OF CONNECTICUT, AS AMICUS CURIAE

FRANCIS A. PALLOTTI,
Attorney-General of the State of Connecticut,
State Capitol,
Hartford, Connecticut.

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In The

Supreme Court of the United States

October Term, 1943

No. 189

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

FEDERAL POWER COMMISSION,
Respondent.

BRIEF FILED ON BEHALF OF THE STATE OF CONNECTICUT, AS AMICUS CURIAE.

Foreword.

This case involves a local electric distributing company which purchases electric energy for the supply of a small portion of its distributing system in the State of Connecticut, the electric energy being supplied by another company, partly (the Commission has found) from sources outside of the State, and being received by the distributing company within the State for local retail distribution therein.

Congress, when it enacted the Federal Power Act, did not intend that the Federal Power Commission should possess regulatory powers with respect to such a company; on the contrary it was intended, under the provisions of the Act, that the State should possess exclusive jurisdiction to regulate such local distributing companies.

NOTE: For convenience, The Connecticut Light & Power Company will be referred to in this brief as "the Company" and the Federal Power Commission will be referred to as "the Commission." The use of italics in quoted excerpts indicates emphasis supplied by the writers of this brief.

The State of Connecticut believes that the assertion by the Commission of current jurisdiction over the Company in the present case represents an unwarranted and illegal invasion of the powers of the State to regulate its local distributing companies, which powers were clearly intended to be preserved to the State under the provisions of the Federal Power Act.

On May 29, 1935, prior to the enactment of the Federal Power Act, the State of Connecticut enacted additional statutory provisions for the regulation of local public utility companies, the purpose of which is stated therein as follows:

> "The general purposes of this Act are to assure to the State of Connecticut its full power to regulate its public service corporations, to increase the powers of the Public Utilities Commission, and to promote local control of the public service corporations of this State, and it shall be so construed as to effectuate these purposes." (Connecticut Public Acts of 1935, ch. 191.)

Section 6 of said Act (Cumulative Supplement (1935) §1414 (e), cl. f, p. 592) provides in part as follows:

> ". . . No gas, electric or water company, or holding company, or any official, board or commission purporting to act under any governmental authority other than that of this state or of its divisions, municipal corporations or courts, shall interfere with or attempt to interfere with or exercise authority or control over any gas, electric or water company incorporated by this state and engaged in the business of supplying service within this state, or with or over any holding company incorporated by this state and doing the principal part of its business within this state, without having first obtained the approval of the commission, except as the United States may properly regulate actual transactions in interstate commerce. Any action contrary to the provisions of this section shall be voidable on order of the commission."

The State of Connecticut has a Public Utilities Commission which possesses jurisdiction over local public utility companies and exercises many of the same regulatory powers with respect thereto which the Federal Power Commission is authorized to exercise over "public utilities" subject to its jurisdiction under the Federal Power Act. In view of the duality of regulation thus engendered, and because of the possibility that conflicts of decision may arise between the state and federal agencies, it is believed that the State of Connecticut possesses a vital interest in the important public questions involved in this case.

Accordingly, the State of Connecticut files this brief as *amicus curiae* in support of the position taken by the Company herein.

Preliminary Statement

On May 15, 1942, the Federal Power Commission determined that the Company "was," during various periods since the effective date of the Federal Power Act, and "*continues to be*" a "public utility" under the Act, and made an order directing the Company to "comply" with the Commission's system of accounts and general accounting orders applicable to such a "public utility".

Determination as to present status. The determination of the Commission with respect to the present status of the Company, and the order directing current compliance with the accounting requirements, were founded upon the ownership and operation by the Company of certain facilities located in a substation at Bristol, Connecticut, by which the Company receives into its local electric system there, electric energy purchased by it from the Connecticut Power Company, an independent and unaffiliated corporation. Although not called for by the Company's arrangements with its vendor, such energy was found to include, at times, electric

energy originating in the State of Massachusetts. The energy so received is sold and distributed by the Company at retail to local consumers in its Bristol district, wholly within the State of Connecticut.

Determination as to past status. Since the State of Connecticut is interested primarily in the Commission's claim to current general jurisdiction over the Company (i.e. at the time of the making of the Commission's determination) and since the Commission predicated such claim solely upon the ownership and operation by the Company of its facilities at Bristol, Connecticut, we shall not discuss herein the situations which existed prior to the hearing and determination of the Commission, with reference to the East Hampton, Torrington-Winsted, and Groton districts of the Company.

Reference to Opinions Below

The findings, opinion and order of the Federal Power Commission are reported unofficially at 44 P.U.R. (N.S.) 170. The opinion of the Court of Appeals for the District of Columbia is reported at 141 F. (2d) 14.

The Questions Involved

The question in which the State of Connecticut is interested is the following:

Whether, under the provisions of the Federal Power Act, a local *distributing* company, operating and *distributing* electric energy for local retail consumption wholly within the State, is a "public utility" subject to the broad regulatory powers of the Federal Power Commission, because such company owns or operates facilities by which it receives within the State, for local *retail distribution* therein, electric

energy purchased from others, and a portion of such energy, through interconnections maintained by the vendors and over which the local company has no control, originates in another state.

Statement of the Case

A. THE FACTS.

The principal facts of the case are set forth in the brief filed on behalf of the Company, and for the sake of brevity, we shall not repeat them here except for a brief reference to the facilities upon which the Commission based its assertion of current jurisdiction over the Company and its accounts.

The facilities owned and operated by the Company used to receive electric energy for the supply of its Bristol District were the *only* facilities owned and operated by the Company at the times of the hearing and determination of the Commission, through which electric energy from Massachusetts was found to pass at such times.

B. THE DETERMINATION OF THE COMMISSION AS TO PRESENT STATUS OF THE COMPANY.

The Commission determined that the aforementioned facilities owned and operated by the Company at Bristol were "used for the transmission of electric energy . . . as distinguished from local distribution thereof," and that "from January 1, 1937 *to the present time*," the Company "*was and continues to be*" a "public utility" under the Federal Power Act.

Thus, while the Commission, with reference to the Company's East Hampton, Torrington-Winsted and Groton Districts, determined that the Company "was" a "public utility"

during specified periods ending prior to the hearing and determination, the Commission determined that the Company was and is presently under its jurisdiction by reason of the Company's present ownership and operation of the facilities at Bristol. The Commission's finding No. 19 reads as follows (R. 69):

> "(19) From January 1, 1937, *to the present time* the Respondent has continuously owned and operated and *now owns and operates* facilities in Bristol, Connecticut, for the transmission of electric energy, transmitted from the State of Massachusetts and consumed in the State of Connecticut by persons other than the transmitter thereof, which facilities were *and are* facilities for the transmission of electric energy in interstate commerce and Respondent was *and continues to be, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act.*"

In accordance with such determination, the order of the Commission purports to direct compliance with its system of accounts and various accounting orders up to the moment of its determination and in the future.* The Commission's order, dated May 15, 1942, which incorporates the Commission's findings as a part thereof, provides, in part:

> "(A) The Respondent is hereby required to *comply* with the aforesaid Order No. 42, order of May 11, 1937, and the other orders supplemental to said Order No. 42; and *to comply* with the accounting

---

* The Commission's intention to direct *current compliance* with its accounting orders and system of accounts is clear from its brief to the Court below. After referring to its findings based on the situation in petitioner's Bristol district, the Commission's brief stated:

> "On these findings there can be no doubt as to the *continuing* power of the Commission to require petitioner as a "public utility" to keep its accounts *henceforth* in accordance with the prescribed original cost accounting system *as directed by the order under review*, in addition to completing the original cost and reclassification studies."

> requirements prescribed thereby, *applicable to it as a public utility* within the meaning of that term as used in that act, as of the effective dates of such orders."

C. THE DECISION OF THE COURT BELOW.

The Court of Appeals held that the Company "*is* a public utility under the Act," without reference to the question of whether its status may have changed since the effective date of the Act.

The Court did not rest its decision, with respect to the Company's *receipts* of electric energy originating outside of the State of Connecticut, upon the determination of the Federal Power Commission that facilities owned and operated by the Company "were facilities for the transmission of electric energy . . . as distinguished from local distribution thereof." Despite the specific exemptions of various facilities from the jurisdiction of the Commission, as contained in section 201 (b) of the Federal Power Act, including "facilities used in local distribution" the Court held that the distinction made by the Commission was unimportant. Thus, the Court said:

> "Therefore, whether or not the facilities by which petitioner *distributes* energy from Massachusetts should be classified as 'local' *is not relevant to this case.* The sole test of jurisdiction of the Commission *over accounts* is whether these facilities, *'local' or otherwise,* are used for the transmission of electric energy from a point in one state to a point in another."

ARGUMENT

POINT I

The company is not a "public utility" under the act, by reason of the sole remaining connection at Bristol, I. E. at the time the commission made its determination.

A. IT IS NOT THE PURPOSE OF THE FEDERAL POWER ACT TO REGULATE LOCAL DISTRIBUTING COMPANIES WHICH MAY RECEIVE AND DISTRIBUTE, WITHIN THE STATE, ELECTRIC ENERGY ORIGINATING IN ANOTHER STATE.

At the time of the enactment of the 1935 amendments to the Federal Power Act, there was a well-defined "no man's land" in the field of electric utility regulation, in which the states were without regulatory power and the Federal government had not exercised its regulatory authority.

Public Utilities Commission v. Attleboro Steam Co., 273 U. S. 83

In the *Attleboro* case, *supra*, this Court held that the sale at *wholesale* of electric energy generated in one state, and the delivery thereof at the state line to a distributing company which sold and distributed the energy at retail in an adjoining state, constituted interstate commerce and that the attempted regulation of the wholesale rates by the state of production constituted a direct burden on such commerce, and so was not within the power of such state.

In order to occupy this "no man's land", Congress enacted the 1935 amendments to the Federal Power Act. Thus, in *Jersey Central Power & Light Co. v. Federal Power Commission*, 319 U. S. 61, 67, the Court said:

"The primary purpose of Title II, Part II of the 1935 amendments to the Federal Power Act, . . . was to give a federal agency power to regulate the sale of electric energy across state lines. Regulation of such sales had been denied to the states by *Public Utilities Commission v. Attleboro Steam Co.*, 273 U. S. 83."

The operations of the Company in the present case, at Bristol, do not fall within the scope of the *Attleboro* decision. The Company does not sell electric energy at wholesale to a distributing company in another state, nor does it deliver electric energy at the state line to another company for distribution in another state. On the contrary, the Company here uses all of the energy purchased from the Connecticut Power Company wholly for local retail distribution in the State of Connecticut.

In similar circumstances, where gas distributing companies purchased supplies of gas from the receivers of interstate companies which transported the gas from other states, and took delivery within the state of consumption, this Court has held that the interstate movement of the gas ceased with its delivery to the local companies, and that their retail rates were subject to regulation by the states.

". . . . *in no proper sense can it be said*, under the facts here disclosed, that sale *and delivery of gas to their customers at burner-tips* by the local companies operating under special franchises *constituted any part of interstate commerce*. The companies *received supplies* which *had* moved in interstate commerce and then disposed thereof *at retail* in due course of their own *local* business. . . . The thing which the receivers actually did was to *deliver* supplies to *local companies*. Exercising franchise rights, the latter *distributed* and sold the commodity so obtained upon their own account . . ." (*Public Utilities Commission v. Landon*, 249 U. S. 236.)

See also: *Missouri v. Kansas Gas Company*, 265 U. S. 298, 308.

The decision of the Court below goes beyond the confines of the "no man's land" left by the *Attleboro* decision and would permit the Federal Power Commission to encroach upon the lines of recognized state authority, contrary to the intent of the 1935 amendments to the Act.

Section 201 of the Act contains the following declaration of policy:

> "It is hereby declared that the business of transmitting *and selling* electric energy *for ultimate distribution to the public* is affected with a public interest, and that Federal regulation of matters relating to generation to the extent provided in this Part and the Part next following *and of that part of such business* which consists of the transmission of electric energy in interstate commerce *and the sale* of such energy *at wholesale in interstate commerce* is necessary in the public interest, *such Federal regulation, however to extent only to those matters which are not subject to regulation by the States.*"

It is plain, we submit, upon the face of the Act that Congress sought only to enter the field of regulation, previously unoccupied, with respect to interstate transactions *at wholesale*, and to endow the Federal Power Commission with regulatory authority only in respect to companies whose activities were so related to such transactions that regulation was appropriate and necessary in order to exercise Federal control over the wholesale rates.

In such circumstances, we do not believe that the "transmission *and* sale" can properly be dissociated from one another in construing the provisions of the Act, but that the "transmission" must be so related to the "sale" which the Act was designed to regulate, that jurisdiction by the Commission over facilities for such "transmission", and over a company owning or operating such facilities, will serve some function reasonably related to the "primary purpose" of the Act to regulate such sales.

The case of *Jersey Central Power & Light Co. v. Federal Power Commission*, 319 U. S. 61, affords an example. There the facilities which were held to be under the jurisdiction of the Commission were used for a "transmission" which *preceded* an interstate sale which was subject to regulation by the Commission. This important fact was given due emphasis by the Court when it said:

> "The purpose of this act was primarily to regulate the rates and charges of the interstate energy. If intervening companies might purchase from producers *in the state of production*, free of federal control, cost would be fixed *prior to the incidence of federal regulation and federal rate control would be substantially impaired, if not rendered futile.*"

As we construe that decision, the facilities for transmission of electric energy over which the Commission is given jurisdiction, are those facilities used for a transmission which *precedes* a sale at wholesale over which the Commission possesses regulatory power. And in this connection, it is to be noted that in the *Jersey Central* case, the Court paraphrased the provisions subsection (b) of section 201 in a manner which we think correctly indicates the meaning of the statutory phrase with relation to "transmission." The Court said (p. 72):

> "Subsection (b) declares that the provisions of this part apply 'to the *transmission* of electric energy *at wholesale* in interstate commerce.' This subsection gives jurisdiction over facilities used for *such transmission.*"

Apart from the question of whether the Company here "transmits" electric energy at Bristol (and we submit that it does not), any "transmission" which could be said to occur, would not fall within the realm of "interstate commerce" as defined by the decisions of this Court prior to the enactment of the 1935 amendments to the Act, and does not fall within the

meaning of "transmission of electric energy *in interstate commerce*" as used in section 201 (a) and (b) of the Act.*

The Company does not sell electric energy at wholesale in its Bristol district, and none of such energy is consumed outside of the State of Connecticut. The Federal Power Commission does not possess the power to regulate any rates charged by the Company to its local retail consumers in the Bristol district. Federal regulation or control of any of the facilities, functions or operations of the Company, including accounting, would serve no legitimate purpose whatever, for no "incidence of federal regulation" occurs with respect to the electric energy after it has been delivered to the Company in the State of Connecticut.

At Bristol the Company operates purely and exclusively as a local distributing company. If the Company received no electric energy originating in Massachusetts, no one would contend that any purpose intended by the Federal Power Act would be served by placing the Company under the jurisdiction of the Federal Power Commission. We submit that the mere fact that the Company may receive some energy from Massachusetts, does not bring it within the focus of any purpose intended by the Act.

B. THE COMPANY DOES NOT OWN OR OPERATE ANY FACILITIES SUBJECT TO THE JURISDICTION OF THE FEDERAL POWER COMMISSION.

The Company, in its brief, has amply demonstrated, we believe, that interstate commerce ceases with the delivery of the electric energy to it at Bristol, and that, from the point of such delivery, the Company does not own or operate any facilities for the "transmission of electric energy in interstate commerce" within the meaning of the Act. We concur with the position

* The definition contained in section 201 (c) will be discussed in subdivision B of this Point.

thus taken by the Company and shall not burden the Court with repetitious argument.

However, we would like to discuss briefly the definition contained in section 201 (c) of the Act, which reads as follows:

> "(c) For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof; but only insofar as such transmission takes place within the United States."

This provision does not purport to treat definitively the acts or situations which constitute a "transmission of electric energy in interstate commerce" within the meaning of the Act. It states merely that certain specified "electric energy" is to be "held to be transmitted in interstate commerce", but it does not specify at what point or points, or by what company or companies, in the chain of transmission from the generator to the consumer, a "transmission in interstate commerce" shall be held to take place.

In the present situation, if any electric energy from Massachusetts flows into the Company's facilities at Bristol, there is no question that such energy is "transmitted in interstate commerce" *at some point in or during some part of, its journey.* The definition makes this clear.* But we submit that the definition cannot properly be construed to mean, that *every* facility from the *point of generation* to the *point of consumption* is a "facility for the transmission of electric energy in interstate commerce."

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* It is to be noted that the definition in subsection (c) would exclude from a "transmission in interstate commerce", electric energy which is both generated and consumed in a single state, even though it may be transmitted across a portion of another state without consumption therein. Such a transmission might fall within the definition of interstate commerce as used in some acts (Cf. Interstate Commerce Act, Part II, §203(a), 49 Stat. 544; 49 U. S. C. A. §303(a)), but not within the meaning of this Act. In this connection, subsection (c) has a very definite restrictive effect.

In this we are not in agreement with the Court below, which gave to subsection (c) an effect not intended by the Act. The Court said:

> "The only alternative to such a conclusion is to adopt the argument of the petitioner that a point can be selected in the instantaneous transmission of energy from Massachusetts to Connecticut where interstate transmission ends and intrastate transmission begins. Petitioner suggests that point can be found at the station where it taps the admittedly interstate line. This theory assumes that electricity is carried in little abstract buckets.** The owner of the interstate line carries the bucket on its interstate journey and hands it to the petitioner in Connecticut. And thus the transmission of electricity is made to look like the sale of a pair of shoes. This conception contradicts all we know about electrical transmission. It is the kind of mythological offspring of an unnecessary union between the law and the natural sciences that make scientists (except expert witnesses) tear their hair . . . We believe it was to escape this legal-electric mythology that the Federal Power Act made the test of jurisdiction depend, not on the current definition of 'interstate commerce' but on the actual transmission of electric energy from one state to another without regard to the mechanical means of that transmission. This language gives us no excuse for indulging in the bucket theory of electrical transmission or for differentiating between the different kinds of equipment over which the energy flows in its instantaneous passage *from a generator in one state to a consumer in another.* It makes the test of whether such energy is

** The assumption relating to the carrying of electricity "in little abstract buckets" appears to have been made wholly by the Court below. No such assumption appears necessary; nor is it necessary to indulge in any "mythology" to explain the plain fact that the Company's vendor delivers electric energy to the Company at Bristol. Perhaps the very concept of a "transmission" of electric energy might make "scientists tear their hair", but the Act is based upon such concept, and we submit that what may be "transmitted", may be delivered from one party to another without the use of "abstract buckets". (Cf. *Public Utilities Commission* v. *Landon*, 249 U. S. 236.)

> actually transmitted between the two states the simple and practical one of reading a meter."
> (*Connecticut Light & Power Co. v. Federal Power Commission*, 141 F. (2d) 14.)

Under such a construction of subsection (c), which gives no effect to the manifest purpose of the Act as recognized by this Court, and no effect to the provisions of subsections (a) and (b) of section 201, the interstate journey of electric energy would not end short of its consumption by the ultimate retail consumer.

We submit that subsection (c) when it used the expression "transmitted in interstate commerce", refers to a transmission which is within the intended scope of the Act as shown by the other provisions to which we have referred, in subsections (a) and (b) of section 201. It was not intended to bring under the jurisdiction of the Commission every facility whatever through which the electric energy may pass, but only those facilities over which the Commission was *intended* to have jurisdiction under the provisions of the Act.

This reasoning was applied by this Court in the *Jersey Central* case, *supra*, in the discussion found in 319 U. S. at pages 70-72. Referring to the argument of the petitioner there, the Court said, in part:

> "But the argument, we think gives no effect to the definition of 'transmitted in interstate commerce' as *used* in this act. In the note below there is set out the pertinent *provisions* of section 201 *which indicate the meaning given the phrase*, which *provisions* are italicized for quick reference.* *Subsections (a) and (b) show the intent to regulate such transactions as are beyond state power under the Attleboro case, supra.* Subsection (c) defines the electric energy in commerce as that 'transmitted from a State and consumed at any point outside thereof . . . The definition

* The note referred to contains the provisions of subsections (a), (b), (c) and (e) of Section 201.

> was used to 'lend precision to the scope of the bill'. It is impossible for us to conclude that this definition means less than it says and applies only to the energy at the instant it crosses the state line and so only to the facilities which cross the line and only to the company which owns the facilities which cross the line. *The purpose of the Act was primarily to regulate the rates and charges of the interstate energy. If intervening companies* might purchase from producers *in the state of production, free of federal control,* cost would be fixed *prior* to the incidence of federal regulation and *federal rate control would be substantially impaired, if not rendered futile.*"

Thus, the Court did not apply subsection (c) as a "definition" of "transmitted in interstate commerce", without reference to the purpose of the Act and its *other* provisions, but looked to the provisions of subsections (a) (b) (c) and (e) "which [the Court said] indicate the meaning given the phrase". And in that case the Court held, in accord with the primary purpose of the Act to regulate interstate wholesale rates, that the facilities of *Jersey Central* were used, as the Court later said, for "the transmission of electric energy *at wholesale* in interstate commerce."

We submit that when the same process of analysis as that followed by the majority of the Court in the *Jersey Central* case, is applied here, it is manifest that "the definition of 'transmitted in interstate commerce' as *used* in this Act," does not include any of the operations or facilities of this Company from the point at which it receives the electric energy from its vendor.

The Court below committed grave error when it gave unbridled effect to subsection (c) and, at one point, said:

> "Therefore, whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as 'local' is not relevant to this case. The sole test of jurisdiction of the Commission over

> accounts is whether these facilities, 'local' or otherwise, are used for the transmission of electric energy from a point in one state to a point in another."

Such an application of subsection (c) would bring under the jurisdiction of the Commission, facilities by which the energy is received by the Company wholly within the State of Connecticut, after all intended purposes of Federal regulation have been served, and the definition in this single subsection, without reference to subsections (a) and (b) would be used to carry the regulatory power of the Commission into the field of local regulation theretofore occupied exclusively by the states. Such was not the intention of Congress and is not the law.

We concur in what the Company has said in its brief with reference to the "but" clause. Whether that clause be construed as an exemption of facilities "used in local distribution", even though they are also used for "the transmission of electric energy in interstate commerce", or whether the clause be construed as one inserted for purposes of clarification, to be construed in harmony with the provisions relating to "transmission in interstate commerce", we think it is clear that the Commission was not intended to have jurisdiction over the facilities of a local distributing company such as are involved in this case.

Since the Company here does not own or operate facilities subject to the jurisdiction of the Commission, it is not a "public utility" within the definition and scope of Part II of the Act, and therefore, is not subject to accounting regulation by the Commission under Part III of the Act.

Point II

The decision of the court below would open up a vast new field of Federal Regulation, contrary to the intention of the Congress as embodied in the Federal Power Act.

The questions presented here, relating to the receipt and local distribution of electric energy within a state, by a local distributing company, were not involved in *Jersey Central Co. v. Federal Power Commission* (319 U. S. 61), nor in *Hartford Electric Light Co. v. Federal Power Commission* (131 F. 2d 953, certiorari denied 319 U. S. 741) where the utility companies before the Courts were generating or transmitting electric energy which *subsequently* crossed a state line and was consumed in another state.

The decision below, unless reversed, would open up a vast new field of jurisdiction for the Federal Power Commission, i.e. over local distributing companies which are fully subject to state regulation, simply because electric energy which they purchase from others may include energy originating in another state. The Court below failed to recognize that no purpose intended by the Federal Power Act would be served by the exercise of such Federal jurisdiction since wholesale rates for interstate sales of such electric energy are subject to regulation by the Federal Power Commission, and the retail rates charged by such distributing companies are subject to exclusive regulation by the state commissions.

In determining, under such circumstances, that the Company is a "public utility" within the meaning of the Federal Power Act, the Court below misconstrued the provisions of the Federal Power Act in such fashion as to expand the application of the Act beyond all bounds of reasonable interpretation. The decision, unless reversed by this Court, will affect the numerous similar situations existing in all parts of the United

States and will seriously prejudice the rights of the states to exercise powers of regulation over utility companies which were intended to be preserved to them by the provisions of the Federal Power Act.

Senator Wheeler, Chairman of the Interstate Commerce Committee, and a co-sponsor of both the Federal Power Act and the Public Utility Holding Company Act of 1935, stated in that Committee's report on the revision of the original bill (Sen. Rep. No. 621, 74th Cong., 1st Sess.):

> "As has been stated, the committee has liberalized title II of the original bill and endeavored to remove all possible grounds for the charge that it imposes harsh or burdensome restrictions upon the electric industry. The revision has also removed every encroachment upon the authority of the States. The revised bill would impose Federal regulation only over those matters which cannot effectively be controlled by the States. The limitation on the Federal Power Commission's jurisdiction in this regard has been inserted in each section in an effort to prevent the expansion of Federal authority over State matters" (p. 18).

The result of the decision of the Court below is to place under the supervision of the Commission all of the matters which fall within its regulatory powers over a "public utility" under the Federal Power Act, including among others, the establishing of interconnections with other "public utilities" for sale to or exchange of energy with them (§202); supervision over mergers and consolidations, as well as over the purchase of securities of another "public utility" (§203); the ascertainment of the cost of the company's property and the depreciation existing therein (§208); the prescribing of the systems of accounts and the supervision of the keeping of the accounts of the company (§301); supervision over the depreciation accounting of the company and the methods of accruing depreciation therein (§302); and the filing of annual reports (§304).

The petition of the Company for writ of certiorari states that, according to a survey made by the Edison Electric Institute, there are over 1,000 local electric distributing companies located in 46 states of the United States, which purchase power from larger power systems, the power supply of almost all of which has some component from an interstate source. Doubtless there are numerous situations throughout the country which are similar to the situation of the Company here at Bristol. Under the decision below, all such companies similarly situated would be subject to the general jurisdiction of the Commission with respect to the aforesaid matters.

The decision below therefore, is one of widespread application throughout the United States and is of great importance to the various states and their citizens.

In the circumstances presented, the assertion and exercise of purported jurisdiction over the Company is not only illegal, but would necessarily interfere with the power of the State of Connecticut to regulate local distributing companies.

The Company, under the decision below, would not only be required to comply with the accounting requirements of the Public Utilities Commission of the State of Connecticut, but also with those of the Federal Power Commission. In the case of conflicts of decision between the two regulatory bodies as to specific items in the accounts, the Company would be required to comply with *both* decisions.

If the Commission continued to assert general jurisdiction over the Company, as it undoubtedly would if the decision below is permitted to stand, many other possibilities of conflict would be present as to matters where dual regulation is involved. For example, the Company might seek and obtain the approval of the State Commission to the acquisition of securities of a company which is a "public utility" under the Act. The Fedral Power Commission would again assert jurisdiction,

(Cf. *Jersey Central Power & Light Co. v. Federal Power Commission*, 319 U. S. 61) and it might deny its approval to the acquisition. The same possibility of conflicts would exist with respect to all other matters as to which the Federal Power Commission exercises regulatory power under the Federal Power Act. The nullification of the power of the State of Connecticut to regulate the business of the Company in such circumstances is apparent.

Such interference with the regulatory powers of the states may be a necessary concomitant where it is required in order to carry out the purposes of the Federal Power Act. Where no purpose of the Federal Power Act is to be served, such interference is unwarranted.

If it be true that one of the purposes of the Federal Power Act, as stated by the Court below, is "to correct abuses of write-ups, inflation of accounts and similar practices which have on occasion been found in the utility industry", such purpose obviously could exist only with respect to companies over which federal control is imposed. Certainly it was not the intention of Congress to correct such "abuses" with respect to local distributing companies whose supervision lies exclusively with the states under the provisions of the Act. If such "abuses" exist in such companies, the state commissions possess plenary powers for their correction and it is no concern of the Federal Power Commission.

Conclusion

THE STATE OF CONNECTICUT JOINS THE COMPANY IN REQUESTING THAT THE JUDGMENT APPEALED FROM BE REVERSED AND SET ASIDE.

Respectfully submitted,

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IN THE

Supreme Court of the United States

October Term, 1943.

No. 189.

THE CONNECTICUT LIGHT AND POWER COMPANY,
Petitioner,

v.

THE FEDERAL POWER COMMISSION,
Respondent.

BRIEF FILED ON BEHALF OF THE CONNECTICUT PUBLIC UTILITIES COMMISSION AND THE NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS, AS AMICI CURIAE, IN SUPPORT OF THE PETITION FOR WRIT OF CERTIORARI.

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August 23, 1944.

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OPINIONS BELOW.

The opinion of the Federal Power Commission, F. P. C. Opinion No. 75, May 15, 1942, (R. 63) is reported in 44 P. U. R. (NS) 170. The opinion of the Court of Appeals for the District of Columbia (R. 1170) is reported in 141 F. 2d. 14.

PRELIMINARY STATEMENT.

The Connecticut Public Utilities Commission is an agency of state government of the State of Connecticut, existing under the provisions of the laws of the State of Connecticut, and having jurisdiction over electric generating, transmission and distribution companies operating within the State of Connecticut.

The National Association of Railroad and Utilities Commissioners is a voluntary Association embracing within its membership the members of the regulatory commissions and boards of the several States of the United States except two, one of which has no State regulatory commission.

By the constitution of the Association, the President of the Association, and the Executive Committee, or either of them, may direct the General Solicitor to appear on behalf of the Association (as distinguished from a particular commission represented in its membership) in any proceeding pending before any court or commission in which, in the judgment of such President or Committee, appearance on behalf of the Association should be made. This brief is offered for filing on behalf of said Association by direction of the President in the general public interest.

QUESTIONS PRESENTED.

(1) Where the only facilities carrying electric energy generated outside the state are owned and operated for the sole purpose of enabling the owner or operator of the same to make local distribution of such energy, is the Company,[1] by reason of such ownership or operation, a public utility subject to jurisdiction under the Act.[2] This

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[1] As used in this brief, "Company" means The Connecticut Light and Power Company.

[2] As used in this brief, "Act" means the Federal Power Act, Act of June 10, 1920, c. 285 (41 Stat. 1063), 16 U. S. C. 791-823, as amended by Act of August 26, 1935, c. 687 (49 Stat. 838), 16 U. S. C. 791a—825r.

question was not raised before the Commission,[3] where it appears to have been understood by all parties that transmission other than for local distribution must be shown in order to establish Commission jurisdiction. The question tried, accordingly, was whether the company was engaged in such other transmission. The Commission found that it was so engaged, and rested its assertion of jurisdiction on that finding. The Court below held the question whether the facilities were used solely for local distribution to be irrelevant, ruling that the "sole test of jurisdiction of the Commission over accounts is whether these facilities, 'local' or otherwise, are used for the transmission of electric energy from a point in one state to a point in another."

(2) Are transmission lines, substations and similar facilities carrying some energy from outside the state, but used only in the business of retailing energy to ultimate consumers; facilities used for the "transmission of electric energy in interstate commerce" as distinguished from facilities used for "local distribution" or "transmission of electric energy in intrastate commerce"? The Commission answered the question in the affirmative (R. 67-69) The Court below said that this question is "not relevant" and expressed no opinion.

(3) Does the fact that the Borough of Groton is a municipal corporation prevent The Connecticut Light and Power Company from becoming subject to the jurisdiction of the Commission by virtue of any of the transactions between the Company and the Borough? The Commission answered this question in the negative. (R. 78) The Court below did not answer it.

(4) Should the Groton situation be disregarded, in determining whether or not the Company is subject to the jurisdiction of the Commission, in view of the negligible amount of the Company's total electric energy that was

[3] As used in this brief, "Commission" means the Federal Power Commission.

involved? The question was not raised in the Commission proceeding. The Court below said no.

STATEMENT OF THE CASE.

The facts of this case, so far as necessary to be stated for the purpose of this brief, are as follows:

The territory served directly by the Company covers a substantial part of the State of Connecticut. The Company distributes electric energy in 107 towns, cities, and boroughs, which have a total population of approximately 660,000 not including about 130,000 served in the State of Connecticut by other companies purchasing substantially all of their electric requirements from the Company. (R. 86-87)

In an order dated May 15, 1942, the Commission determined that the Company was, during various specified periods since August 25, 1935,[4] and continues to be, a "public utility" subject to the jurisdiction of the Commission. (R. 63-82) The order requires the Company to comply currently with accounting requirements applicable to such public utilities.

This determination by the Commission was based upon two different kinds of operations by the Company. One of these, involving the Bristol, East Hampton, and Torrington-Winsted districts, related to the purchase of electric energy from other companies for local distribution. (R. 71) The other situation, involving the Groton district in Connecticut, related to the sale of electric energy by the Company to the Borough of Groton, which in turn sold part of the energy to another company which transmitted it from Connecticut to Fishers Island, New York. (R. 70)

The Court below held that each of these operations gave rise to Federal Power Commission jurisdiction, and the Commission order was sustained. Because of the different

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[4] Parts II and III of the Federal Power Act (Title II of the Public Utility Act of 1935) was approved August 26, 1935.

legal aspects of these two kinds of operations, the facts regarding them are separately stated below.

THE BRISTOL, EAST HAMPTON, AND TORRINGTON-WINSTED DISTRICT.

The Company supplied customers in the Bristol, East Hampton, and Torrington-Winstead districts only at retail, with one unimportant exception.[5] These districts were not, during the respective periods when the Commission found the facilities subject to its jurisdiction, connected with the main system of the Company.

For the Torrington-Winsted district the Company purchased energy from the Torrington Electric Light Company, which obtained its supply either from its own plant or from the Connecticut Power Company.[6] The electric energy which the Torrington Electric Light Company received from the Connecticut Power Company was supplied from the so-called C. P. lines.[7] The Commission found that the electric energy transmitted over the C. P. lines to the Torrington Electric Light Company and thence to facilities of the Company "regularly, frequently and over substantial periods of time" included electric energy in substantial amounts transmitted from Massachusetts. (R. 66-69)[8]

The electric energy from the C. P. lines which reached the Company's facilities in the Torrington-Winsted district were supplied from the 2,300 volt bus of the Torrington

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[5] The only exception is the sale of a negligible amount of energy to the Torrington Electric Light Company, generated in the Robertsville plant of the Company near Winsted. There was no claim that any of this energy found its way into interstate commerce. (R. 400, 404, 659, 660-661, 688-689)

[6] The Connecticut Power Company is a corporation entirely separate from the Company. (R. 975-976)

[7] The term "C. P. lines" is an abbreviation for "Connecticut Power Lines" the lines being owned by the Connecticut Power Company.

[8] The Company disputes this finding by the Commission and contends in its brief to this Court that the Court below erred in refusing to weigh the testimony as to jurisdictional facts. For the purpose of this brief only, Petitioners are assuming the correctness of this Commission finding.

Electric Light Company's Torrington substation. The Company maintained a substation at Torrington with facilities for raising voltage from 2,300 to 27,600 volts, a substation at Winsted with facilities for lowering voltage from 27,600 to 4,600 volts, and a 27,600 volt double circuit wood pole line 10 miles or more in length, between those two substations. (R. 68) The Commission found that these were facilities "for the transmission of electric energy . . . as distinguished from local distribution thereof" and that such facilities were used "for the transmission of electric energy in interstate commerce." (R. 68)

On June 17, 1941,[9] the Company ceased to receive electric energy from the C. P. lines for its Torrington-Winsted district. An admitted purpose for discontinuing this connection was to avoid being held by the Commission to be engaged in interstate commerce. (R. 73)[10] The Commission held that, from January 1, 1937 to June 17, 1941, the Company was, by virtue of its ownership and operation of the described facilities in this district, a "public utility within the meaning of that term as used in the Federal Power Act." (R. 68)

For the East Hampton district the Company purchased energy directly from the Connecticut Power Company. Delivery was taken at Pole 110 of the Connecticut Power Company's tap line leading from the C. P. lines which, as noted above, the Commission had held carried energy transmitted from Massachusetts. (R. 66) The Company maintained a substation at Leesville for reducing voltage from 13,800 volts to 4,600; substations at East Hampton,

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[9] The Commission instituted its show cause proceeding on January 7, 1941. The hearing before the Commission began on July 7, 1941.

[10] The Company had been a member of the Connecticut Valley Power Exchange prior to enactment of the Federal Power Act, but discontinued its membership before August 26, 1935. The Connecticut Valley Power Exchange, according to a Commission finding in this case (R. 66) and in *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. 2d 953, certiorari denied, 319 U. S. 741, transmits electric energy in interstate commerce.

Colchester, Comstock Bridge, Collins Hill and Westchester for reducing voltage to 2,300 volts; and 13,800 volt lines connecting these substations to the facilities of the Connecticut Power Company at Pole 110. (R. 67) The Commission found that these were facilities "for the transmission of electric energy . . . as distinguished from local distribution thereof" and that such facilities were used "for the transmission of electric energy in interstate commerce." (R. 67)

On July 1, 1939, the Company severed its connection with the Connecticut Power Company at Pole 110, one of the considerations for doing so being its policy to avoid being held by the Commission to be engaged in interstate commerce. The Commission held that, from January 1, 1937, until June 30, 1939, the Company was, by virtue of its ownership, and operation of the described facilities in the East Hampton district a "public utility within the meaning of that term as used in the Federal Power Act." (R. 67)

For the Bristol district the Company purchased energy directly from the Connecticut Power Company. Delivery was, and continues to be, taken at the Company's substation in about the center of Bristol, Connecticut, from the Connecticut Power Company's tap line leading from the C. P. lines. (R. 68) At its Bristol substation the Company maintains leads from the aforesaid tap line, lightning arrestors, disconnects, oil circuit breakers, busses, step-down transformers, and appurtenant structures and facilities of the outdoor substation; a synchronous condenser and appurtenant facilities in the adjacent substation building; and facilities connecting the synchronous condenser with the outdoor substation facilities referred to above. The Commission found that these were facilities "for the transmission of electric energy . . . as distinguished from local distribution thereof" and that such facilities were used "for the transmission of electric energy in interstate commerce." (R. 69) The Company has not discontinued this connection with the C. P. lines. The Commission held that,

from January 1, 1937, "to the present time" the Company "was and continues to be, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act." (R. 69)

GROTON DISTRICT.

From and including August 26, 1935 to the date of the hearing, the Company sold electric energy to the Borough of Groton, a municipal corporation, for resale. From and including August 26, 1935 to February 28, 1941, the Borough of Groton, continuously sold to Fishers Island Farms, Inc., and its successor, The Fishers Island Electric Corporation (which corporations are hereinafter referred to without distinction as Fishers Island) a substantial portion of the electric energy which it purchased from the Company. Fishers Island transmitted this electric energy from Connecticut and distributed and sold it at retail in the State of New York. (R. 64) The electric energy so transmitted to New York constituted about 1/5 of 1% of all the energy generated and received by the Company throughout the State of Connecticut. The Company had knowledge that part of the electric energy which it sold to the Borough of Groton was being resold to Fishers Island and transmitted outside the state. (R. 64).

When the contract with the Borough of Groton expired in 1940, the Company would not enter into a new contract while the Borough continued to sell to Fishers Island. This was in accordance with the Company's policy to avoid being held by the Commission to be engaged in interstate commerce. (R. 73) Fishers Island proceeded to construct its own source of power on Fishers Island. The connection between Fishers Island and the Borough of Groton was severed in February, 1941, thus terminating this flow of electric energy from Connecticut to New York. (R. 73, 1052-1053) The Commission found that from August 26, 1935 to February 28, 1941 the facilities used by the Company in conveying electric energy to the Bor-

ough of Groton, were facilities "for the transmission and sale at wholesale of electric energy in interstate commerce, and Respondent was, by virtue of its ownership and operation of such facilities, a public utility within the meaning of that term as used in the Federal Power Act." (R. 65)

SPECIFICATION OF ERRORS.

The Court below erred:

1. In affirming the order of the Commission determining the Company to be a "public utility" by reason of the ownership and operation of facilities in the Bristol district and determining the Company to have been, at stated times in the past, a "public utility" by reason of the past ownership and operation of facilities in the Torrington-Winsted and East Hampton districts.

2. In affirming the order of the Commission determining the Company to have been, at stated times in the past, a "public utility" by reason of ownership and operation of facilities in the Groton district.

REASONS FOR GRANTING THE WRIT.

(1) This is the first case adjudicated by a court calling for the determination of whether a company which *receives* energy from an interstate transmission line, for local distribution, is a "public utility" subject to Parts II and III of the Act. *Jersey Central Company v. Federal Power Commission*, 319 U. S. 61, involved the status, as a "public utility", of a company which *transmitted* electric energy, part of which thereafter found its way outside the state. *Hartford Electric Light Co. v. Federal Power Commission*, 131 F. 2d 953, certiorari denied, 319 U. S. 498, involved the status, as a "public utility", of a company which *generated* and *sold* electric energy at the point of generation for transmission in interstate commerce.

(2) Under the law, as laid down by the Court below, notwithstanding the reassurance attempted to be given therein, practically every operating electric utility in the United

States, of any consequence, will be within the reach of the jurisdiction of the Commission, if the Commission undertakes to assert jurisdiction. Such a result would bring extensive duplication and overlapping of state and federal regulation, an outcome which Congress clearly intended to avoid when it enacted the Act.

(3) The Court below held that "whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as 'local' is not relevant to this case." This view goes far beyond any contention which the Commission made before the Court. It is at least open to grave doubt whether this view of the law will be adopted by this Court—a doubt which will almost surely produce further litigation in other cases unless put at rest in this case by this Court.

(4) These questions are questions of substance and general importance relating to the construction of a federal statute. They have not been, but should be, settled by this Court. The misconstruction which the Court below has placed upon the Act should be corrected now by a decision of this Court, so that the Commission may understand and observe the limits of its jurisdiction; so that further unnecessary litigation may be avoided; so that local distributing companies may know what will be the legal consequences of their acts; and so that the States may be left undisturbed in the exercise of their proper powers, which Congress designed to preserve.

ARGUMENT.

I.

The Company is Not Now, and has Not Been a "Public Utility" Subject to the Jurisdiction of the Commission by Virtue of the Ownership and Operation of Facilities in the Torrington-Winsted, East Hampton and Bristol Districts.

A company owning and operating only facilities used solely in local distribution is not a "public utility" subject to Commission jurisdiction.

Until the Court below rendered its decision there had been no disagreement upon the principle that a company owning and operating only facilities used solely in local distribution is not subject to Commission jurisdiction. The Commission had not challenged this principle either in its findings and opinion or in its brief to the Court below. Indeed, the Commission based its decision, that the Company was a "public utility" subject to Commission jurisdiction, upon a finding that the Company owned and operated facilities used for transmission "as distinguished from local distribution thereof." (R. 67-69)

But the Court below waved aside any question as to whether the Company's facilities in these districts were or were not "facilities used in local distribution." The Court said that this "is not relevant to this case." The sole test of jurisdiction, said the Court, "is whether these facilities, 'local' or otherwise, are used for the transmission of electric energy from a point in one state to a point in another."

The Court below, in reaching this conclusion, first referred to the statutory language which, when read together, seemed to support the principle referred to above.[11] The

[11] The Court said: "Petitioner's argument runs as follows: It is not required to keep accounts unless it is a 'public utility' (Section 301) A public utility is any person who owns or operates

Court conceded that such a construction is a "grammatical possibility." But then the Court advanced three reasons why it reached a contrary conclusion: (1) To exempt companies operating only facilities used for distribution would "contradict the broad purpose of the Act to correct abuses of writeups, inflation of accounts and similar practices . . . "; (2) Section 201(b), as analyzed in the *Hartford* case, does not provide such an exemption; and (3) such exception would force acceptance of the artificial conception "that electricity is carried in little abstract buckets."

The primary purpose of the Act was not to correct abuses of writeups, inflation of accounts and similar practices, but to provide Federal regulation of the sale of electric energy at wholesale in interstate commerce. *Jersey Central Company* v. *Federal Power Commission, supra.* Where the Commission is given jurisdiction, under the Act, to regulate wholesale rates, that regulation is to include, among other things, the correction of these abuses. But there is nothing in the Act to indicate that the existence of the abuses would itself subject facilities to Commission jurisdiction. As was said in *United States* v. *Chase,* 135 U. S. 255:

> "We recognize the value of the rule of construing statutes with reference to the evil they were designed to suppress as an important aid in ascertaining the meaning of language in them which is ambiguous and equally susceptible of conflicting constructions. But this court has repeatedly held that this rule does not

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facilities subject to the *jurisdiction* of the Commission. (Section 201(e)). The Commission does not have *jurisdiction*, except as specifically provided, over facilities used in local distribution. (Section 201(b)) While the Act specifically provides for the keeping of accounts on facilities in local distribution it does not specifically provide for *jurisdiction* over such local facilities. (Section 301) From this it is argued that even though the energy which petitioner distributes comes from another state it is not a public utility under the jurisdiction of the Commission because the facilities which it owns are for local distribution."

apply to instances which are not embraced in the language employed in the statute, or implied from a fair interpretation of its context, even though they may involve the same mischief which the statute was designed to suppress. (citing cases)"

The Court below intimates, in this connection, that an interstate system could defeat the primary purpose of the Act by separating its local distribution system through "artificial corporate manipulation" unless the distribution system which receives interstate energy is also subject to federal regulation. But, bearing in mind that the primary purpose of the Act is the regulation of wholesale rates for interstate energy, it is at once apparent that segregation of the local distributing system could not possibly defeat or impair attainment of that primary purpose. By the time the local distributing company receives the electric energy the wholesale rate has been already incurred for services already rendered. No operation of the distributing system, nor any abuses arising from such operation, could possibly affect the wholesale rate.

Turning to Judge Frank's analysis of Section 201 (b) in the *Hartford* case (not concurred in by Judge Hand), relied upon by the Court below, we note that the conclusion is reached that the so-called "but" clause in that section does not reduce the authority conferred on the Commission over "all facilities" for "the sale at wholesale in interstate commerce," in the earlier part of the sentence, by excluding "facilities used for generation."[12]

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[12] Section 201(b), with the "but" clause italicized reads as follows:

"(b) The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a State line. The Commission shall have jurisdiction over all facilities for such transmission

It is to be observed that Judge Frank's analysis is confined solely to the question of whether *generation* facilities are subject to regulation. His reference to Section 201 (a) and most of the legislative history upon which he relies, is directed to that issue alone. But let us examine the legislative history directly bearing upon the question of whether facilities used for *local distribution* are exempt.

The background of this legisaltion should first be noted. In *Pennsylvania Gas Co.* v. *Public Service Commission*, 252 U. S. 23, this Court had held that the New York Commission had the power to regulate rates at which natural gas, transmitted directly from the source, of supply in Pennsylvania, is sold, by the same company, to consumers in the cities and towns of New York.[18] But in *Public Utilities Commission* v. *Attleboro Steam & Electric Co.*, 273 U. S. 83, state commissions were held constitutionally incapable of regulating wholesale rates for electric energy transmitted in interstate commerce. Congress desired to overcome this hiatus in regulation by providing Federal regulation of wholesale rates where interstate commerce was involved, *but to go no farther* since local distribution, even of energy which had crossed state lines, was fully

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or sale of electric energy, *but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter.*"

[18] This case was later expressly disapproved to the extent that it conflicted with *East Ohio Gas Co.* v. *Tax Commission*, 283 U. S. 465. However, the principle announced in the *Pennsylvania Gas Co.* case to the effect that the mere fact that the service crossed a state line did not preclude state regulation, was not disapproved. This is shown by the later citation of the *Pennsylvania Gas Co.* case in support of that principle in *Illinois Gas Co.* v. *Public Service Co.*, 314 U. S. 498; *Jersey Central Co.* v. *Federal Power Commission*, *supra* (dissenting opinion of Mr. Justice Roberts); and *Federal Power Commission* v. *Hope Gas Co.*, 320 U. S. 591 (separate opinion of Mr. Justice Jackson).

subject to state regulation. This clear intent is apparent from a reading of the legislative history.

The Bill first presented was introduced in the Senate by Senator Wheeler as S. 1725, and in the House by Congressman Rayburn as H. R. 5423. In the bill as introduced, Section 201 read as follows:

> "Section 201 (a) The provisions of this title shall apply to the transmission and sale of electric energy in interstate commerce and to the production of energy for such transmission and sale, *but shall not apply to the retail sale of energy in local distribution.* The Commission shall have jurisdiction over all facilities for such transmission, sale, and/or production of energy by any means and over all facilities connected therewith as parts of a system of power transmission situated in more than one State, *except facilities for the retail distribution of electric energy*, or for the production or transmission of energy solely for the use of the producer or transmitter or the use of his tenants on property owned or controlled by him and not for resale. Every person who owns or operates facilities subject to the jurisdiction of the commission under this title and every person who controls, directly or indirectly, any such person shall be subject to the provisions of this title and title III. The term 'public utility' when used in this title and title III means any person who owns or operates such facilities.
>
> "(b) Electric energy shall be held to be transmitted in interstate commerce if transmitted from a State to any point outside thereof; or between points within the same State but through any point outside thereof; or from or to any place in the United States to or from a foreign country; but only insofar as such transmission takes place within the United States." (emphasis supplied)

It is plain beyond the possibility of question that the intent of the language just quoted was to exclude from the jurisdiction of the Commission "facilities for the retail distribution of electric energy". It is equally plain, that, under the quoted language, a local company distributing

electric energy from another state, by facilities used solely for local retail distribution, would not have been subject to Commission jurisdiction.

Upon the bill containing this language Committee hearings were held in each House. Objection was made to the broad sweep of the bill. The Senate Committee reported the bill in a new draft, as S. 2796. As reported and passed by the Senate, Section 201 read as follows:

> "Section 201. (a) it is hereby declared that the business of generating, transmitting, and selling electric energy for ultimate distribution to the public is affected with a public interest, and that Federal regulation of that part of said business which consists of the transmission and sale of electric energy in interstate commerce and the generation of electric energy for such transmission and sale is necessary in the public interest. It is further declared to be the policy of Congress to extend Federal regulation to those matters which cannot be regulated by the States, and also to exert Federal authority to strengthen and assist the States in the exercise of their regulatory powers *and not to impair or diminish the powers of any State commission.*
>
> "(b) The provisions of this part shall apply to the transmission of electric energy in interstate commerce, to the sale of electric energy at wholesale in interstate commerce and to the production of electric energy for such transmission or sale, *but shall not apply to the retail sale of such energy in local distribution.* The Commission shall have jurisdiction over all facilities for such production, transmission, or sale of electric energy by any means and over all facilities connected therewith as parts of a system of power transmission situated in more than one State, *except facilities used only for the production or transmission of electric energy in intrastate commerce or in local distribution* or for the use of the producer or transmitter. Every person who owns or operates facilities subject to the jurisdiction of the Commission under this part shall be subject to the provisions of this part and the part next following." (emphasis supplied)

We point out that the bill, when introduced, exhibited the peculiar grammatical structure which appears in Section 201 (b) as enacted, in that a broad all-inclusive provision was limited and cut down by a "but" clause, as follows:

> "The provisions of this title shall apply to the transmission and sale of electric energy in interstate commerce and to the production of energy for such transmission and sale *but shall not apply to the retail sale of energy in local distribution.*" (emphasis supplied)

This "but" clause was plainly designed to reduce the effect of the preceding sentence by excluding from the Commission's jurisdiction sales of electric energy to consumers. Also we point out that the next following sentence contained an "except" clause for a similar purpose of exclusion. These first two sentences, with some changes in phraseology, were carried into Section 201(b) of S. 2796, the "but" form being retained in the first sentence, and the "except" form in the next following sentence. Among the exceptions stated in the "except" clause in S. 2796 were "facilities used only * * * in local distribution." It was this "except" clause which finally became the "but" clause discussed in the opinion below.

We submit that it must be apparent that when the Senate passed the bill there was no more occasion for including such facilities in the "except" clause than there was for retaining them in that clause when it had become the "but" clause. The grant to which the exceptions were stated was a grant of "jurisdiction over all facilities for *such* production, transmission or sale", with the "such" relating back to "the transmission (and) * * * to the sale of electric energy at wholesale in interstate commerce", in the first sentence of the paragraph. It is obvious, just as was stated in the opinion in the *Hartford* case, that "such facilities could not possibly be among those used for the interstate transmission or interstate wholesale sales"; *but it is just*

as obvious that in the bill as passed by the Senate they were named in the "except" clause with the design that they should be excluded from the Commission's jurisdiction. The purpose of the clause at that stage was not open to question.

The House, having held hearings on H. R. 5423 redrafted S. 2796, and passed the same in a new form. As so passed Section 201(b) read as follows:

> "(b) The provisions of this Part shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but shall not apply to any other sale of electric energy or deprive a State or State commission of its lawful authority now exercised over the exportation of hydroelectric energy which is transmitted across a state line. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, *but shall not have jurisdiction over facilities used for generation of electric energy or over facilities used in local distribution* or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter." (emphasis supplied)

The House thus brought the first and second sentences of Section 201(b) into uniformity in grammatical structure by adopting the "but" form of exception for each. There is absolutely nothing to indicate that in doing this it intended that the "but" clause should have a different construction from that which it had in the bill as received by the House from the Senate. As we have just pointed out, it can not be doubted, that the "but" clause and the "except" clause were both used by the Senate as exception clauses.

When the bill went to conference between the two Houses, the second sentence of Section 201(b) was amended, so that such jurisdiction as was designed to be conferred by certain other sections should not be affected.

Section 201(b) took its final form, the second sentence being made to read as follows:

> "The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, *except as specifically provided in this Part and the Part next following*, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter." (emphasis supplied)

The purpose of this exception within the exception clause is obvious. By Sections 207, 301(a) and 308 of the bill, the Commission was specifically granted jurisdiction touching generation. Also in Section 202(c) and (d) it was provided that in time of war or of national emergency the Commission should have power "to require by order such temporary connection of facilities and such generation * * * of electric energy" as the Commission should find requisite in the public interest.

By these several sections, the Commission was specifically enabled to exercise jurisdiction for certain purposes under certain circumstances as respects generation, under Parts II and III. It was not intended that such jurisdiction should be affected by the exception incorporated in the "but" clause in Section 201(b). Accordingly, Congress inserted the exception within the "but" clause.

Such insertion, however, merely prevented the jurisdiction specifically granted, as aforesaid, from being brought into question. It did not have the effect of extending the grant of jurisdiction made in other parts of the Act. The grant of jurisdiction to impose accounting regulations, contained in Section 301(a), is confined to licensees and to public utilities. The distinguishing mark of a public utility remains the ownership or operation of facilities subject to the jurisdiction of the Commission. Under said Section

201(b) these are facilities for the transmission or sale of electric energy "not used in local distribution." Nowhere in the Act is jurisdiction "specifically provided" as to facilities so used. Accordingly the exception within the "but" clause can have no possible application in this case.

In the *Hartford* case Judge Frank also argued that, since the "but" clause also included facilities used for intrastate transmission, and since such facilities could not possibly be among those used for interstate transmission or interstate wholesale sales:

> "the 'but' clause becomes foolish if interpreted as carving out of the authority granted in the earlier part of the same sentence the facilities described in the 'but' clause . . ."

The general concept of "intrastate commerce" cannot be carved out of the general concept of "interstate commerce," since, as a general proposition, commerce is either wholly one or the other. But Congress was not here dealing with general concepts, it was dealing with statutory definitions. There is no doubt that Congress has power to divest interstate commerce transactions in which the states have an especial interest of such immunity from state regulation or control as might otherwise attach to them, by reason of their interstate character. A good example of this is the Webb Kenyon Act[14] divesting the interstate movement of intoxicating liquor of its character as interstate commerce and making it subject to state prohibition laws. The Constitutional power of Congress to do this, and of the states to exercise the control thus made available to them was sustained in *James Clark Distilling Co.* v. *Western Maryland R. Co.*, 242 U. S. 311.

It is plain that Congress intended to exclude from regulation under the Act some portion of the business of "transmission of electric energy in interstate commerce and the

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[14] Act of March 1, 1913 (37 Stat. 699, 27 U. S. C. 122), reenacted without change by Act of August 27, 1935, 49 Stat. 877.

sale of such energy at wholesale in interstate commerce," for, in Section 201(a), it expressly declared the need for such federal regulation to extend "only to those matters which are not subject to regulation by the states"; and it followed that declaration with an express provision, in Section 201(b), that the Commission "shall not have jurisdiction * * * over facilities used in local distribution."

Local distribution, in the absence of legislation providing for federal regulation, is "subject to regulation by the states." In the light of the language just quoted from the Act, and of the history of the Act, it seems altogether plain that it was the intent of Congress that such distribution, and facilities used therefor, should not be subject to the jurisdiction of the Commission under the Act. To hold that facilities used solely for local distribution are nevertheless subject to the jurisdiction of the Commission if they are used in transmitting electric energy moving in interstate commerce, in the broad sense of that term, is to deny effect to the express provision of Section 201(b).

The third point which the Court below relied upon to support its view that a company owning only local distribution facilities may be a "public utility" subject to Commission jurisdiction is that, otherwise it would be necessary to accept the artificial conception "that electricity is carried in little abstract buckets."

There would be merit in the argument on this point in the opinion below if the question here was the determination of the constitutional power of Congress under the Commerce Clause, or the constitutional limitations on the States, in the absence of Federal legislation. Perhaps neither the Commission nor the Courts could draw such an arbitrary line of demarcation in conflict with physical facts, if the issue was one of constitutional law. But the question is whether Congress has done so by statute. That is to be determined by examining the statute, its background and legislative history, not by comparing the speed or other physical properties of electricity with other forms of interstate movement.

There is nothing either unusual or abhorent in providing, by statute, an arbitrary line of demarcation between Federal and State jurisdiction. If Congress were to be denied this power then the determination by Congress of what is to be Federally controlled and what is to be State controlled could no longer be based upon a wise review of economic and political factors. It would be dependent alone upon the accident of physical facts. Congress has a perfect right to say: "Regardless of the characteristics of electrical transmission, the Commission's jurisdiction to regulate interstate transmission will end here, and state regulation may begin."

The facilities owned and operated by the company were only facilities used in local distribution or for the transmission of electric energy in intrastate commerce.

As developed in the previous paragraphs, a company which owns and operates only facilities used in local distribution is not a "public utility" subject to Commission jurisdiction. This would, for the same reasons, be true with respect to a company which owns and operates only facilities used for the transmission of electric energy in *intrastate* commerce. The Commission, in its findings and opinion, recognized this, but reached the conclusion that certain facilities of the Company in the three districts now under consideration, were facilities used for interstate transmission "as distinguished from local distribution". (R. 67-69) In making that determination the Commission applied this test:

> "* * * transmission, in our opinion, extends from the generator, where generation is complete, to the point where the function of conveyance in bulk over a distance, which is the essential characteristics of 'transmission', is completed and the process of subdividing the energy to serve ultimate consumers, which is the characteristic of 'local distribution', is begun." (R. 75)

Applying this test the Commission found that, although the Company took delivery of interstate energy at its own substation in about the center of Bristol,[15] and used that energy only for local distribution in Bristol, the Company owned facilities in Bristol which were used in the transmission of electric energy in interstate commerce "as distinguished from local distribution." The nature of these so-called interstate transmission facilities is described in the Statement of The Case, above.

The Commission test makes the statutory exemption of companies operating local distribution and intrastate transmission facilities meaningless. If any local distributing company receives interstate energy at a substation or anywhere else on its system, it must utilize facilities of the character operated by the Company at Bristol. When it does so the Commission says it is a "public utility" subject to regulation as such under the Act. Hence there could never be a case where a local distributing company, receiving interstate energy, would be exempt from Commission regulation. Yet that is exactly what Congress intended when it exempted such companies in Section 201 (b). The language denying jurisdiction over facilities used in local distribution can have had no other purpose, since an exemption of companies not using any energy which had crossed a state line would obviously have been unnecessary.

The only alternative to this is to say, as the Court did in the *Hartford* case, that the "but" clause is not an exemption carved out of interstate transmission and wholesaling companies, but is a "negatively worded confirmation of the Commission's jurisdiction, in certain circumstances, over the facilities mentioned in the 'but' clause." The conflict between this construction and the Congressional intent, as shown by the legislative history of the Act, has been discussed under the preceding section of this brief.

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[15] The Bristol connection with the C. P. lines was the only connection remaining at the time of the hearing. The Torrington-Winsted connection had ceased on June 17, 1941 (R. 73), and the East Hampton connection ceased on July 1, 1939. (R. 67)

The Commission based its test solely upon the physical facts of interstate transmission. Conceivably that transmission extends to the light bulb of the ultimate consumer. although the Commission, with no sacrifice of jurisdiction, has found such transmission to end short of that. But what we are here trying to determine is not the physical fact of *interstate transmission*, but the legislative intent as to the extent to which such transmission shall be subject to the jurisdiction of the Commission.[18] That the movement of electric energy may be *interstate transmission* without being *transmission in interstate commerce*, within the meaning of this statute, is demonstrable from the Act itself. Section 201 (c) reads:

> "(c) For the purpose of this Part, electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point *outside* thereof, * * *" (emphasis supplied)

Thus energy transmitted from a point in one state to a point in another and then back to a point in the first state, where it is consumed, is not "transmitted in interstate commerce" within the purview of the Act. *Re Chicago District Electric Generating Corporation*, Federal Power Commission Opinion No. 63, 39 P. U. R. (NS) 263. But no one will deny that there has been "interstate transmission" of such energy.

In determining its policy as to federal regulation, and the relationship between federal and state regulation, Congress certainly is not to be baffled and circumscribed by the accident that electric energy travels fast, or that transmitted energy is usually not stored; or that there is no process

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[18] We are not here even concerned with the constitutional power of states to regulate, in the absence of a Federal statute, commerce which has crossed a state line. If we were, the cases would seem to support the view that the interstate movement ends with delivery of the energy to the distributing company. *Public Utilities Commission* v. *Landon*, 249 U. S. 236; *Missouri* v. *Kansas Gas Co.* 265 U. S. 298; *South Carolina Power Co.* v. *South Carolina Tax Com.*, 52 F. 2d 515, aff'd 286 U. S. 525; 60 F. 2d 528, aff'd sub nomine *Broad River Power Co.* v. *Query*, 288 U. S. 148.

akin to breaking of an original package. Congress can draw the line wherever it desires to draw it, as shown by the definition in Section 201 (c) of the Act; and as Congress has done in the equally instantaneous movement of telephone and telegraph communications (Section 3(e) and 221 (b) of the Communications Act of 1934, 47 U. S. C. 153 (e), 221(b)); and has done with respect to the transportation of intoxicating liquors. (Webb-Kenyon Act, *supra*)

Reading together Sections 201 (a) and (b) and referring to the legislative history, it is not difficult to determine where Congress intended to draw the line between "transmission in interstate commerce" on the one hand, and "local distribution" or "transmission in intrastate commerce" on the other. Congress wanted to overcome the hiatus in regulation created by the decision in the *Attleboro* case. That hiatus would be overcome by providing for Federal regulation of transmission and sales of electric energy at wholesale in interstate commerce.

To make certain that Federal regulation would extend no farther, Section 201 (a) provides that "such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States." Neither the Company nor the Commission nor the Court below contends that a state commission is constitutionally disabled from regulating facilities owned and operated within a state for the sole purpose of local distribution. Those facilities, being "subject to regulation by the States," are consequently not intended, by Congress, to be included within the terms "(facilities for) transmission * * * and * * * sale of electric energy at wholesale in interstate commerce."

Applying this test of Congressional intent, rather than the Commission's test of physical fact, to the facilities in question, the result is obvious. All Company facilities in these districts are subject to state regulation. Consequently they are not facilities subject to regulation by the Commission. So applied, there will be no hiatus in regulation and there will be no Federal regulation of "those matters which are * * * subject to regulation by the States."

II.

The Company Is Not Now, and Has Not Been, Subject to the Jurisdiction of the Commission by Virtue of the Ownership and Operation of Facilities in the Groton District.

The Commission asserted jurisdiction over the Company by reason of its ownership and operation of facilities used in transmitting and selling electric energy at wholesale to the Borough of Groton, a portion of which energy was thereafter sold by the Borough to Fishers Island and transmitted outside the state.

The Borough of Groton is a municipal corporation. The Act expressly exempts from Commission regulation transactions with or by municipal corporations and hence, we submit, nothing in connection with the transmitting and wholesaling of electric energy to the Borough, or the Borough's later sale of electric energy to Fishers Island could and did subject the Company to Commission regulation. This point is fully discussed in the Company's brief herein, pages 38-40, and we will not repeat the discussion in this brief.

But however the Court may decide that point, it is submitted that the Groton situation should be disregarded because of the negligible amount of the Company's electric energy involved. Only about 1/5 of 1 per cent of all the energy generated and received by the Company throughout the State of Connecticut was transmitted out of the state because of this connection with the Borough of Groton.[17]

Here is a large state-wide electric utility company which, except for this insignificant amount of energy transmitted second-hand to New York, is generating or transmitting no energy for export from the state. Is it reasonable to suppose that Congress had in mind the extension of Federal jurisdiction to all of the facilities of such a company because of this trifling dribble of electric current across a

[17] No interstate transmission took place after February 28, 1941.

state line? If there was ever an occasion for application of the rule *de minimis non curat lex* to test the limits of Federal *statutory* jurisdiction, this is it.

We are not here concerned with the constitutional power of Congress to extend Federal regulation to such a case, but whether Congress intended to do so. It is for this reason that such cases as *National Labor Relations Board* v. *Fainblatt*, 306 U. S. 601, 606; *Valvoline Oil Co.* v. *United States*, 308 U. S. 141, 147 (cited in the Commission's brief to the Court below), holding that Federal jurisdiction under the Commerce Clause is not dependant upon volume, are not applicable here. Where the question is the *intent* of Congress rather than the *power* of Congress, volume may become a very important consideration. As the Court said in the *Fainblatt* case, *supra*:

> "• • • The amount of the commerce regulated is of special significance only to the extent that Congress may be taken to have excluded commerce of small volume from the operation of its regulatory measure by express provision or fair implication."

The language of the Act read together, and its legislative history, certainly give rise to a "fair implication" that Congress did not intend to convert an intrastate utility into an interstate utility because of any such trivial circumstance as this.

The Commission, in its brief to the Court below, countered this *de minimis* argument with the assertion: "The company serving Fishers Island is as such entitled to the protection of Section 202(b), 205, 206, 207, and 306 of the Federal Power Act with relation to petitioner as though it were as powerful as petitioner."

Just what "protection" can the Commission give Fishers Island even assuming that the Company is a public utility subject to Commission jurisdiction and that Fishers Island is still receiving some of the Company's energy? The sales of energy by the Company to the Borough of Groton are expressly exempt under Section 201(f). The

sales of energy by the Borough to Fishers Island are likewise exempt under the same section. With all the accounting control in the world over the Company, how much good can that do to Fishers Island when the regulation of wholesale rates to and by this municipal corporation are exempt? Certainly the application of the *de minimis* rule is not going to deprive Fishers Island of any protection it would otherwise receive.

The Court below appeared to recognize the validity of the *de minimis* rule in determining the extent of Federal statutory jurisdiction, saying:

> "We do not believe Congress intended that a large electric power system which was essentially *intrastate* in character should come under Federal jurisdiction because of some insignificant or temporary outside connection. * * *" (emphasis supplied)

Then the Court reached the conclusion that the character of the Company was essentially *interstate*. This conclusion was not based upon the relatively inconsequential connections in the four districts discussed in this brief, but because the Company, prior to passage of the Act, had been a member of the Connecticut Valley Power Exchange and had withdrawn from this interstate power pool to avoid Federal regulation.

The Court's conclusion that membership in this power pool is evidence of its "essentially interstate character" is based upon a misconception of the facts. As pointed out in the Company's brief (pages 40-42), the power received from this pool was a comparatively unimportant part of its statewide business. But aside from this, it seems wholly inadmissible that the status of an electric company as a "public utility" subject to Federal regulation, is to be determined by circumstances no longer in existence when the Act became effective. The Commission's power extends only over facilities "which transmit energy actually moving in interstate commerce." *Jersey Central Power Co.* v. *Federal Power Commission, supra.* The fact that the Com-

pany's facilities did at one time, prior to the act, transmit energy moving in interstate commerce is obviously immaterial.

The Court below seems to feel that the Company should be penalized because it purposely terminated its connection with the interstate power pool to avoid Federal regulation. But the Commission itself has held that the Act does not require a company to continue ownership or operation of the facilities which make it a "public utility". *Re Twin State Gas & Electric Company, Federal Power Commission* opinion No. 44, 33 P. U. R. (NS) 39. And this Court has announced the rule that no criticism is justly to be made because a person takes steps to escape regulation or taxation. In *Superior Oil Co.* v. *Mississippi*, 280 U. S. 390, it was said:

> "The only purpose of the vendor here was to escape taxation. It was not taxed in Louisiana, and hoped not to be in Mississippi. The fact that it desired to evade the law, as it is called, is immaterial, because the very meaning of a line in the law is that you intentionally may go as close to it as you can, if you do not pass it."

We submit that application should be given to the *de minimis* rule in this case and that the Company should not be held to be a "public utility" because of the ownership and operation of facilities over which a minor fraction of one percent of the Company's energy found its way across a state line.

CONCLUSION.

It can not be too strongly emphasized that no question of Federal power is presented here. This case, as with *Federal Trade Commission* v. *Bunte Bros.*, 312 U. S. 349, 355, "presents the narrow question of what Congress did, not what it could do." The extension of federal control into traditionally local domains is a "delicate exercise of legislative policy in achieving a wise accommodation between the needs of central control and the lively maintenance of local

institutions." *Palmer* v. *Massachusetts*, 308 U. S. 79, 84. This Court has insisted on a "suitable regard to the principle that whenever the federal power is exerted within what would otherwise be the domain of state power, the justification of the exercise of the federal power must clearly appear." *Florida* v. *United States*, 282 U. S. 194, 211. And, as said in *City of Yonkers* v. *United States*, 320 U. S. 685:

> "* * * Where a federal agency is authorized to invoke an overriding federal power except in certain prescribed situations and then to leave the problem to traditional state control, the existence of federal authority to act should appear affirmatively and not rest on inference alone."

That the Connecticut Public Utilities Commission has both constitutional and statutory power to regulate every phase of the Company's utility operations is not questioned. That allowance of Federal Power Commission jurisdiction over the Company's accounting practices will produce overlapping Federal-State regulation, cannot be denied. That such overlapping regulation, in this case where the state is fully competent to act, violates the declaration of policy (Section 201(a)) that Federal regulation is "to extend only to those matters which are not subject to regulation by the States", is obvious.

We ask that the writ be granted, to the end that the erroneous construction of the Federal Power Act by the Court below may be corrected and the erroneous judgment based thereon may be reversed.

Respectfully submitted,

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CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1943.

No. 189.

THE CONNECTICUT LIGHT AND POWER COMPANY, *Petitioner*,

v.

THE FEDERAL POWER COMMISSION, *Respondent*.

MEMORANDUM FOR ARGUMENT TO BE MADE ON BEHALF OF THE PUBLIC UTILITIES COMMISSION OF CONNECTICUT, THE STATE OF CONNECTICUT AND THE NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS

by

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PRESS OF BYRON S. ADAMS, WASHINGTON, D. C.

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May it Please the Court:

I make this argument for the Connecticut Commission, the State of Connecticut and the National Association, upon our brief filed August 23, 1944, and upon the brief of Attorney General Pallotti, filed December 27, 1944.

I shall discuss only the situation as presented at Bristol, East Hampton and Torrington-Winsted, as to the Groton situation merely making reference to the discussion in our Association brief.

The Question Presented.

The question presented here is whether the principle of the *Jersey Central case* can be extended to cover this case.

That case established that an intrastate company, which makes no interstate sales is nevertheless subject to the Act if it owns facilities used in transmitting electric energy on its way from the place where generated to a distributing company in another state.

In this case, this company, through use of the facilities at the places just mentioned, makes no interstate sales, and has no part in transmitting energy from one state to another; but it does receive energy which has been so transmitted, and does transmit the same in local distribution—not for sale to other distributors, but only for its own use, in supplying its own consumer customers.

Because the *Jersey Central case* made the Act applicable to any company which, although not selling in interstate commerce, does transmit energy in its course to a distributing company in another state, it results that every interstate sale of energy at wholesale, and all transmission of energy so sold, until its receipt for local distribution, is already subject to the Act, without any further extension, to make it applicable to a case like this.

The Jersey Central decision brought under the Act many companies which make no interstate sales. The extension attempted here would bring under the Act practically all remaining intrastate companies.

The Jersey Central Decision Negatives This Attempted Extension.

Whether the majority decision in the *Jersey Central case* was or not expressive of the intent of Congress, there was logic in it, for it could be argued that, the declared purpose of Congress being to regulate interstate sales to distributing companies, the language of the Act should be construed to give the regulatory Commission jurisdiction over all

transmission from the generating plant to the distributing company, so that the Commission might reach all transmission in any way affecting the wholesale transaction, if called upon to make an order for the improvement of service to the distributing company, or to establish reasonable charges for transmission,—for, as Mr. Shea told you upon the argument in the Jersey Central case,—Congress designed to provide regulation of charges for transmission, when no sale of energy is involved as well as regulation of charges for energy sold. There was logic, I say, in so construing the Act as to enable the Commission to reach all transmission up to the delivery to the distributing company, for that would tend to insure attainment of the main purpose of the Act; but there is no logic in this proposed extension, to make the Act cover transmission after the energy has been received by the distributing company, for such extension can aid in no way towards the accomplishment of any purpose of the Act.

The Jersey Central decision not only does not support this order, but the majority opinion in that case negatives the construction of the Act made by the Court below, and also that made by the Commission, as I shall show.

How can any purpose of the Act be served by extending the Commission's jurisdiction to a local distributing company, which renders no service subject to Commission regulation?

The Broad Purpose of the Act was the Regulation of Interstate Wholesale Contracts, Not the Reformation of Accounts.

The Court below apparently felt driven to discover some purpose to be served, so it said that a construction holding facilities used solely in local distribution to be not subject to the Commission's jurisdiction would "contradict the broad purpose of the Act to correct write-ups, inflation of accounts and similar practices."

But where, in the Act, is that purpose expressed? This Court, in the *Jersey Central case*, said:

> "The primary purpose * * * was to give a federal agency power to regulate the sale of electric energy across state lines. Regulation of such sales had been denied to the States by Public Utilities Commission v. Attleboro Steam & Electric Co., 273 U. S. 83, * * *
>
> Subsections (a) and (b) show the intent to regulate such transactions as are beyond state power under the Attleboro Steam & Electric Co., Case." (319 U. S. 67-70)

That was the broad purpose which this Court saw, instead of the reformation of accounts, as the Court below assumed. Reformation of accounts was not even a purpose required by the Act to be accomplished. What, if anything, in that line was necessary, by way of correction of past write ups, and of inflated accounts was left to be determined by the Commission.

Accounts, to be kept as the Commission might direct, were a means to the end, and not *the* end for which the Act was passed. Accounts are merely one of the working tools given to the Commission to enable it to regulate interstate wholesale rates.

This Court, in the *Goodrich Transit Co. case* (224 U. S. 211), held that the Interstate Commerce Commission might prescribe accounts covering property and business wholly intrastate, and admittedly beyond the Commission's jurisdiction.

The provision in this Act, under which the Commission, for a company otherwise subject to its jurisdiction, may prescribe accounts covering facilities such as these, does not make such *facilities* subject to its jurisdiction.

All Facilities of This Company at the Places Under Discussion are Used Solely in Local Distribution.

We claim that all of the facilities of this company used at Bristol, and at the other places covered by this discussion, are facilities used "solely in local distribution". The

Court below recognized them as distribution facilities, but held that whether they were "local or otherwise" was irrelevant, because, as it held, facilities used solely in local distribution may nevertheless be subject to the jurisdiction of the Commission if used in any transmission of electric energy moving from one state into another. The court said:

> "Therefore, whether or not the *facilities by which* petitioner *distributes* energy from Massachusetts should be classified as 'local' is not relevant to this case. The sole test of jurisdiction of the Commission over accounts is whether these facilities, 'local' or otherwise, are used for the transmission of electric energy from a point in one state to a point in another."

The Court's recognition that all these facilities are distribution facilities we think unavoidable; and we think also that their local character is obviously relevant and decisively excludes them from the Act.

The only business of this company, at the places mentioned, is the distribution of electric energy to consumers, as distinguished from the business of generating and selling to other companies in interstate commerce. Plainly then, all of its facilities must be used in distribution. That they are "used in local distribution" as that phrase is used in this statute, seems equally plain.

At Bristol,—distinguishing that place at the moment from other places,—the substation consists of facilities without which the energy could not be received and distributed. From the substation, the voltage having been lowered, distribution is made immediately to consumers. Obviously these Bristol facilities are "used in local distribution" *at that very point*. They must be within the exclusion phrase, unless every company owning facilities used in receiving interstate energy is to be brought under the Act: and plainly such construction would cut off the exclusion phrase from having any effect whatever, in violation of established rules of construction.

But are the Bristol facilities, because subdivision of energy received over the same is immediate, to be classified

as "facilities used in local distribution", while some of these other facilities, such as transmission lines from points of reception to points of subdivision, are to be classified as "facilities used in transmission which is *not* local"?

What did Congress intend to be covered by the phrase "used in local distribution"?

To find the answer to that question, let us consider the purpose of the Act, and where that phrase came from, and how it happens to be in the Act.

This Court says that the purpose was to provide regulation for that part of the business which the states could not regulate under the Attleboro decision, leaving to the states what they could regulate.

In the Attleboro opinion, distinguishing that case from the *Pennsylvania* case, this Court had said:

> "In the Pennsylvania Gas Co. case, * * * the court said that * * * the thing which the New York Commission had undertaken to regulate, while part of an interstate transmission, was '*local* in its nature', pertaining to the furnishing of gas to *local* consumers, * * * and that such '*local* service' was not of the character which required general and uniform regulation." (273 U. S. 87)

Further, the Court said:

> "The test of the validity of a state regulation is not the character of the general business of the company but whether the particular business regulated is essentially *local* or *national* in character." (273 U. S. 90)

Can there be any question that the Court in that language used the word "local" as opposed to "national", to apply to the business of supplying consumers, such as it dealt with in the Pennsylvania case, in contrast to the business of selling in interstate commerce to distributing companies, such as, in the Attleboro case, it was holding to be "national in character"?

Working to adapt the statute law to this Attleboro decision, the Congress wrote into the Act the phrase "used in

local distribution" to exclude all of the facilities used in distribution in a business local in its nature, as distinguished from national.

All of the facilities of this company, now under discussion, must, accordingly, fall equally within the exclusion, if the term "local" is to be given the same meaning which it plainly had in the opinion of this Court from which Congress took the term.

The Court Below Discarded the Jurisdictional Test Prescribed by Congress.

Congress said the Commission's jurisdiction should be determined by this double test: "Does the company control facilities used (1) in interstate transmission which (2) is not local in character but national?"

The Court below rejected this double test and said the "sole test of jurisdiction" is "whether these facilities 'local' or otherwise are used for the transmission of electric energy from one state to another".

Why was the double test which Congress directed thus disregarded? Because of the inherent difficulty which the Court assumed to be involved in attempting to apply it. The Court ridiculed the idea that there can be any such division of facilities, saying that it necessitates the assumption that "electricity is carried in little abstract buckets" from one state to another. Such a conception the Court called "legal-electric mythology".

The acceptance of the "sole test" announced in the opinion was assumed to be inescapable. The court said the only alternative to such an acceptance

> "* * * is to adopt the argument of the petitioner that a point can be selected in the instantaneous transmission of energy from Massachusetts to Connecticut where interstate transmission ends and intrastate transmission begins." (R. 1175)

Considering a conception of electrical transmission which would permit application of the use-of-facilities test to be mythological in character, the court said:

> "We believe it was to escape this legal-electric mythology that the Federal Power Act made the test of jurisdiction depend, not on the current definition of 'interstate commerce' but on the actual transmission of electric energy from one state to another without regard to the mechanical means of that transmission. This language gives us no excuse for indulging in the bucket theory of electric transmission or for differentiating between the different kinds of equipment over which the energy flows in its instantaneous passage from a generator in one state to a consumer in another." (R. 1176)

Evidently, in the conception of the Court below, transmission from the generator, all the way to the consumer, is an "instantaneous transmission in interstate commerce" subjecting to the Act the distributing company doing the "local" business, as well as the company doing the wholesale "national" business, as the Court said, "without regard to the mechanical means of that transmission".

That is the construction by the Court below upon which this judgment rests.

Can the judgment stand in face of the fact that Congress made ownership of facilities, as this Court said in the Jersey Central case, "the determinative fact" as to jurisdiction. Are not "facilities" the mechanical means of transmission?

There is No Difficulty to a Willing Mind in Understanding and Applying the Congressional Test.

The Court below failed to apply the statutory test because of a supposed difficulty in discovering a point, in the course of transmission, at which facilities cease to be used in the national business, and from which they are used only in the local business.

This supposition manifestly attributes to Congress an impotence which this Court never attributed to it. The question is not where does this instantaneous transmission cease to be within the reach of Congress, but how far, in its course, did Congress choose to regulate that transmission. Congress may stop where it will. If it chose to stop at the point of delivery to the distributing company, that is where the commission's jurisdiction ends.

There is no difficulty, to a willing mind, in understanding where Congress intended to stop, if we remember, what this Court, in the Jersey Central case, said the purpose of Congress was,—which was to regulate wholesale interstate transactions of transmission and sale, held in the Attleboro case to be beyond state reach, but not to regulate matters of transmission or sale which the states could reach. We know from the opinion of this Court that that is what Congress wanted to do.

We have seen that the phrase "in local distribution" was a direct adaptation from the Attleboro opinion. The Congress worked with the opinions of this Court before it.

In the *East Ohio Gas Company case* (283 U. S. 465) this Court said that when gas is brought into a state at high pressure, and the pressure is let down for distribution to consumers, what takes place thereafter is intrastate commerce. Judge Parker, citing that case, in the *South Carolina Power Company case* (52 Fed. 2nd 515) had applied that principle to the importation and distribution of electric energy; and this Court had refused certiorari.

These were recent decisions, fresh in the mind of Congress when this Act was passed. Guided by them, Congress thought that electric energy, brought into a state in interstate commerce, might, upon arrival be distributed in intrastate commerce. Congress did not intend to grant the Federal Commission jurisdiction over such distribution, so in subsection (b) it excluded facilities used in "transmission in intrastate commerce".

Also this Court in the *Pennsylvania Gas Company case*

(252 U. S. 23), had held that the sale to consumers of gas produced in another state, by reason of the local character of the transaction, might be regulated by the state where sold: and in the Attleboro case, this Court indicated that the principle of the Pennsylvania case applied to the electric business. The Congress did not intend to interfere with state regulation of local sales, so it provided that facilities "used in local distribution" should not be subject to Commission jurisdiction.

Here the phrase, "used in local distribution" may have a wider application than "transmission in intrastate commerce", because it may cover transmission to local consumers across state lines.

To accomplish its purpose to regulate only interstate wholesale transactions, Congress in the concluding phrases of sub-section (b) excluded from Commission jurisdiction facilities if owned

(1) by one who transmits only for his own consumption, or

(2) only in intrastate commerce, or

(3) only in his own sales to consumers, though delivery may cross a state boundary.

The only other facilities, over which the Commission *can* have jurisdiction, under the Act, are facilities used by a company to transmit energy for sale at wholesale in interstate commerce. These facilities are not so used. Could the purpose of Congress to exclude them possibly have been made more plain?

In the *Morgan case* (307 U. S. 291), this Court admonished regulatory agencies and Courts of review that, in the administration of a rate regulatory statute, they should so coordinate their actions, and "words should be so construed" as to attain the end aimed at in the statute.

With the utmost deference to the Commission and to the Court of Appeals we express belief that the rule applies in

a case like this; and that in such a case the attempt should be to attain the evident end aimed at by Congress, rather than to discover an adroit way of escape from doing so. We feel that the admonition of this Court has not been observed.

The Court Below Did Not Heed the Construction Given to Sub-Section (a) in the Jersey Central Case.

It is plain that the Court below gave little heed to the opinion of this Court, construing this very Act, in the Jersey Central case. That opinion makes clear the exclusion of these facilities from the Commission's jurisdiction. In that case it was claimed (by the company but not by our Association) that the limitation in sub-section (a),—"which are not subject to regulation by the states",—operates to exclude from Commission regulation all transactions which might be regulated by state power. Negativing that claim, this Court said:

> "The sounder conclusion, it seems to us, is that this limitation, is directed at generation, transmission and *sales*, rather than the corporate arrangements of the utilities engaged in such production and distribution." (319 U. S. 74)

From this construction of this limitation we know that it is directed at the very matters which we are here discussing,—*matters of transmission.*

Certainly, the transmission here discussed is not subject to the Act if Congress intended otherwise. This limitation was designed to have application to transmission. This transmission is in a "local business", such as this Court holds a state may regulate. And the intent of Congress to exclude these facilities from Federal regulation was made plain by an apt phrase, adapted from the very *Attleboro opinion*, which led to the enactment of this statute.

If the exclusion phrase is ever to be given application in any case must it not apply here? Can it be held that this

transmission, and these facilities, would be beyond the reach of state power, if there were no Federal Power Act? If the New Jersey Commission, today, acting within the ambit of statutory authority, finding transmission to be defective, should order changes in these facilities, for the improvement of service to consumers, would its order be held to be beyond state power? Unless the Court would so hold, is not this transmission, and the facilities used therein, marked by the limitation, as outside the Commission's jurisdiction, under the construction already placed upon the limitation, in subsection (a), in the *Jersey Central* opinion?

Under the construction given to subparagraph (a) in that opinion, the exclusion provisions in subparagraph (b) may be given meaning and effect. The construction of the Court below, however, would nullify both those provisions and the limitation in subparagraph (a), and would bring under the Commission's jurisdiction all facilities over which any power from another state is transmitted. We think that construction clearly foreclosed by the *Jersey Central* opinion.

The Court Below Having Rejected the Statutory Test Finally Cast Aside Its Own "Sole Test."

Plainly, this "sole test", announced below, if applied without modification, would bring every company distributing any energy from another state under the Commission's jurisdiction, however restricted the operations of a company, or however insignificant the amount of interstate energy distributed. Few local companies would escape, since few do not distribute *some* interstate energy.

Apparently the Court below recognized that to sweep all these companies, without exception, under the jurisdiction of the Commission would do obvious violence to the undeniable purpose of Congress to limit, to some extent at least, the application of the Act. So the Court below, notwithstanding the "sole test" which it had just announced, proceeded to modify that test,—in fact to substitute another,—by saying:

> "We do not believe Congress intended that a large electric power system which was essentially intrastate in character should come under Federal jurisdiction because of some insignificant or temporary outside connection. But if we keep the purpose of the Act in mind we can avoid unreasonable extensions of Federal jurisdiction. The Court needs only to look at the character of the organization and its facilities in order to determine whether it can reasonably be classified as an interstate system." (R. 1176)

Thus the Court, having thrown away the rule which Congress had prescribed, threw away its own rule also, and substituted what we may call the rule of reason.

Under this substituted rule, whether the Commission has jurisdiction is not to be determined, as Congress said, by the ownership of facilities used in transmission to fill contracts which the Act was designed to regulate, nor is it to be determined by the Court's so-called "sole test", of the ownership of any facilities used in any interstate transmission. Instead of ownership of facilities being determinative, such ownership merely makes the company subject to the Act when the Commission finds that assertion of its jurisdiction will be "reasonable". It is as simple as that!

Thus the Commission is enabled to reach whatever company it will, when it will.

No company can ever escape by appeal, for the finding of a jurisdictional fact by the Commission is conclusive, if based upon evidence fit to be called substantial, the Court below says.

So much for the construction of the Court below. Let me come now to the Commission's construction.

The Commission's Construction of the Act.

Apparently, when it wrote its opinion, the Commission never dreamed that it had any such discretion as the rule of reason would give to it. Seemingly, it considered that it was bound by the statutory provision that it should

have no jurisdiction over a company owning only facilities used solely in local distribution. Its claim of jurisdiction, in its opinion, is based upon a conclusion that the facilities we are now discussing are not "used in local distribution".

To reach that conclusion, the Commission construed the statutory phrase "in local distribution" to embrace only that part of the company's local operation which begins with the process of subdividing energy at low voltage. All the rest is classified as "transmission in interstate commerce, as distinguished from local distribution."

By this device of construction the Commission accomplishes at one fell swoop all that the rule of reason, promulgated by the Court below, would enable the Commission to accomplish piecemeal, since every company receiving energy in volume must have reception facilities.

Judge Frank's Discussion of the "But Clause" in the Hartford Case.

Both the Court below, and the Commission in its brief, point to Judge Frank's discussion in the *Hartford case*, of what he called the "but clause," as sustaining a decision that the concluding phrases of subparagraph (b) are not exclusion phrases at all, but the reverse.

The decision in the *Hartford case* did not depend upon the construction given to the "but clause" by Judge Frank; and the denial of certiorari here certainly implied no approval of that fantastic construction.

The *Hartford case* involved the question whether a generating company, making sales at wholesale in interstate commerce, is subject to the Act. The Commission, so holding, found that the company owned facilities, other than generating facilities, used in making the sale. The Court of Appeals sustained the Commission's order.

If the Act was intended to embrace sales by generating companies, the order of the Commission was properly sustained, regardless of any error of Judge Frank in his construction of the so-called "but clause."

We have demonstrated, I think, in that part of our brief beginning at page 17, that Congress used the language now in that clause for the purpose of limiting the effect of the preceding general grant of jurisdiction.

As the bill was passed by the Senate it read:

> "The provisions * * * shall apply to the transmission of electric energy * * * but shall not apply to the retail sale of such energy in local distribution. The Commission shall have jurisdiction over all facilities for such * * * transmission or sale * * * *except* facilities used only for * * * transmission of electric energy in intrastate commerce or in local distribution." (Sec. 201 S. 2786)

Certainly the purpose of the language, up to that point, was to except from the Commission's jurisdiction facilities used in local distribution or in intrastate commerce.

The House simply brought the first and second sentences of subsection (b) into uniformity of grammatical construction, by adopting the "but" form of exception for both sentences. There is absolutely nothing to indicate that in doing this it intended the "but clause" should have any different effect than when it was begun with the word "except".

It is Demonstrable From Sub-Section 201(c) That the Phrase "Transmission in Interstate Commerce" Was Not Intended by Congress to be Construed in the All-Inclusive Sense Attributed to it Below.

The Commission construed the Act as designed to give it jurisdiction over all facilities used in transmission in interstate commerce, in the broad sense of that term. But that such was not the sense in which the phrase "transmission in interstate commerce" was used by the Congress is demonstratable from the Act itself. The definition in Section 201 (c) reads:

"For the purposes of this part electric energy shall be deemed to be transmitted in interstate commerce if transmitted from a state and *consumed* at any point *outside thereof*."

But it is certain from decisions of this Court that energy passing from a state into another and back into the first state again is transmitted in interstate commerce, within the broad meaning of that term. However, in accordance with its purpose to limit the exercise of Federal power, transmission of that character was excluded from the Act by the definition just read. Such exclusion demonstrates that Congress did not use the phrase "transmission in interstate commerce" in the all-inclusive sense of that term, which was attributed to it below.

The manifest purpose of subsection 201 (c) was not thereby to grant jurisdiction, already granted in subsection 201 (b). It was, rather, to limit the preceding grant, by restricting the scope of the phrase "transmission in interstate commerce", for the purpose of this Act, so that no transmission of electric energy distributed and consumed in the State where generated should be subject to Federal regulation, even though it might pass through another state, on its way from the place of generation to the place of delivery to a distributing company.

SUPREME COURT OF THE UNITED STATES.

No. 189.—October Term, 1944.

The Connecticut Light and Power Company, Petitioner, vs. Federal Power Commission.	On Writ of Certiorari to the United States Court of Appeals for the District of Columbia.

[March 26, 1945.]

Mr. Justice Jackson delivered the opinion of the Court.

The Federal Power Commission has asserted jurisdiction to regulate the accounting practices of the Connecticut Light and Power Company. The Federal Power Act as amended in 1935, 49 Stat. 838, 16 U. S. C. § 792 *et seq.*, declares a congressional policy concerning the business of transmitting and selling electric energy for ultimate distribution to the public, and states that regulation of "that part of such business which consists of the transmission of electric energy in interstate commerce is necessary in the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States." § 201(a), 49 Stat. 847, 16 U. S. C. § 824(a).

The Company, incorporated by Connecticut, serving customers only in Connecticut and owning no utilities property outside of that state, is comprehensively regulated by the Connecticut Public Utilities Commission in accounting practices as in many other matters, and it challenges the jurisdiction of the Federal Power Commission.

The State of Connecticut, appearing *amicus curiae*, through its Attorney General avers that this assumption of jurisdiction by the Federal Commission "represents an unwarranted and illegal invasion of the powers of the State to regulate its local distributing company, which powers were clearly to be preserved to the State under the provisions of the Federal Power Act." The Connecticut Public Utilities Commission joins with the National Association of Railroad and Utilities Commissioners also appearing as *amicus curiae*, and they contend that the Federal Power Commission's order regulating accounting practices exceeds any authority given by the Federal Power Act and intrudes upon the field which that Act expressly reserved to local regulation.

The basic facts are not seriously in dispute. The Company for some time prior to August 26, 1935, the effective date of the Federal Power Act, operated as a member of the Connecticut Valley Power Exchange, an interstate power pool which interchanged energy among certain systems in New York, Massachusetts, and Connecticut. Had such operation continued, the Company would be subject to the Act and to the Commission's order. Two days before its effective date and frankly for the purpose of avoiding federal regulation the Company rearranged its operations with intent to cut every connection and discontinue every facility whose continued operation would render it subject to the Federal Power Commission's control. The Commission conceded in its opinion and the Government admits here the Company's right to do so.[1] But the Commission said petitioner's effort was "only a gesture" for while it cut certain connections "it did not cut other interconnections over which interstate energy flowed." Of those facilities which the Commission held subjected the Company to the Power Act at the time it became effective the Company has since divested itself of all but one, and on that one the Commission rests its present jurisdiction to control petitioner's accounting. But it also claims that its accounting orders were entitled to obedience up to the time of the abandonment of the other facilities and because of them.

The facilities on which jurisdiction is predicated are for two general types of operation, one being used in receipt of interstate power, the other for transmission of energy sold to a municipality which in turn sold some part of it for export from the state.

The only presently existing facilities said to confer jurisdiction are at Bristol. Here the petitioning company purchases energy from the Connecticut Power Company, which despite a confusing similarity of name is an entirely separate and unaffiliated concern. The petitioning company receives power at 66,000 volts from the lines of the Connecticut Power Company over a short tap line, owned by the Connecticut Power Company, which leads to petitioner's substation. There the energy is stepped down to 4,600 and 13,800 volts and transmitted thence over many circuits

[1] Cf. Re Twin State Gas & Electric Co., 33 P. U. R. (NS) 39, where the Commission approved a public utility's sale of certain facilities even though the sale might have been "a step in the direction that eventually results in the vendor company obtaining a status other than that of a public utility within the jurisdiction of this Commission."

to consumers in and around Bristol. The substation includes all of the usual equipment, lightning arrestors, disconnects, oil circuit breakers, buses, stepdown transformers, and appurtenant structures of an outdoor substation; and in the substation building a synchronous condenser is owned and operated, as required by the supply contract, to maintain the power factor.

What is called the East Hampton connection, severed July 1, 1939, consisted of facilities by which the petitioner received energy from the Connecticut Power Company at 13,800 volts and transmitted it several miles to its Leesville substation where it was reduced to 4,600 volts and to other substations where it was reduced to 2,300 volts and supplied to customers. What is referred to as the Torrington-Winsted District connection, discontinued in June of 1941, was differently operated. Energy was purchased from the Torrington Electric Light Company, which in turn had purchased it from the Connecticut Power Company. Delivery was accepted by petitioner at the bus bar of the Torrington Company at low voltage, 2,300 volts, petitioner maintained a substation which stepped this voltage up to 27,600, at which it was transmitted about ten miles over its lines to a substation at Winsted where facilities were operated to lower the voltage to 4,600, whence it was put on distribution lines.

The Commission held in all three instances that such facilities of petitioner were "for the transmission of electric energy . . . as distinguished from local distribution thereof." It found that the energy received from the Connecticut Power Company and Torrington Company "regularly, frequently and for substantial periods of time included electric energy in substantial amounts transmitted from Massachusetts." Hence it concluded petitioner owned facilities for transmission of energy in interstate commerce and was a "public utility" under its jurisdiction by virtue of the Act.

The other type of operation on which it predicated jurisdiction was terminated in February 1941. It consisted of sale of energy at wholesale to the Borough of Groton, which operated a municipal distribution plant. The Borough, with knowledge of the Company, resold a portion of this energy to a corporation which transmitted it to Fishers Island, a small island off Connecticut shore but territory of New York. There it was distributed to that small community at retail. When the Groton contract expired

in 1940 petitioner refused to renew it unless the Borough discontinued sales of energy destined for Fishers Island. This change was required by the Company avowedly to eliminate flow of its energy to New York and thus to remove one of the grounds on which the Commission has asserted jurisdiction.

The Commission held that from the effective date of the Act to February 28, 1941, facilities owned by the Company were used to convey electric energy to the Borough of Groton "for the transmission and sale at wholesale of electric energy in interstate commerce" and that such facilities were for transmission of such energy "as distinguished from local distribution thereof." Hence the Company was held to have been a public utility during the period of such operation and subject for that period to the jurisdiction of the Commission.

It is not denied, although the Commission's findings and opinion make no mention of the fact and appear to have given it no weight, that the predominant characteristic of the company's over-all operation is that of a local and intrastate service. It serves one hundred seven towns, cities, and boroughs of Connecticut with a total population of about 660,000 and in addition supplies substantially all the power used by local companies which serve communities of Connecticut having a population of 130,000. It owns no lines crossing the Connecticut boundary and does not connect with any other company at the boundary. It has no business other than Connecticut service for which it needs any facilities whatever, and if local distribution service were terminated, no remaining purpose or use of any kind is suggested for the facilities in question. Its purchases and sales, its receipts and deliveries of power, are all within the state. Its rates and its fiscal and accounting affairs are fully and so far as appears effectively regulated by the State of Connecticut.

The Federal Power Commission on January 7, 1941 issued its order requiring petitioner to show cause why it should not be held to be a "public utility" subject to the Act and why it should not reclassify and keep its accounts according to the Federal Commission's uniform system. On May 15, 1942 it issued findings and decision. Rehearing was denied. The Company then applied for the review by the Court of Appeals of the District of Columbia to which the statute entitles it. § 313(b) of the Act, 49 Stat. 860.

The Court of Appeals sustained the orders. 141 F. 2d 14. It held that "The Federal Power Act obviously intends to confer Federal jurisdiction upon electric distribution systems which normally would operate as interstate businesses." It construed the "but clause" of the Act, which we shall later consider, as "intended to make it clear that this [the Commission's] jurisdiction extends even to local facilities where the Act provides for their regulation, as it does in the case of accounting practices." The Court concluded that "Therefore, whether or not the facilities by which petitioner distributes energy from Massachusetts should be classified as 'local' is not relevant to this case. The sole test of jurisdiction of the Commission over accounts is whether these facilities, 'local' or otherwise, are used for the transmission of electric energy from a point in one state to a point in another." We granted certiorari. — U. S. —.

The first question is whether the reviewing court acted under a misapprehension as to the meaning of the statute.

The jurisdictional and regulatory provisions of the Federal Power Act apply only to "public utilities," and the Act provides that by "public utilities" it "means any person who owns or operates facilities subject to the jurisdiction of the Commission." § 201(e), 49 Stat. 848. These facilities are carefully defined. "The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, over facilities used for the generation of electric energy or over facilities used in local distribution or only for the transmission of electric energy in intrastate commerce, or over facilities for the transmission of electric energy consumed wholly by the transmitter." § 201(b). Transmission and sale as used in this provision are further defined to mean respectively "transmission of electric energy in interstate commerce" and "sale of electric energy at wholesale in interstate commerce." And the Act goes on to say: "electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof" and that sale of electric energy at wholesale means "a sale of electric energy to any person for resale." §§ 201(c), (d). Of course as preamble to all of these provisions stands the policy declaration that Federal regulation "of that part of such business which consists of the transmission of electric energy in interstate commerce and the

sale of such energy at wholesale in interstate commerce is necessary in the public interest, such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States." § 201(a).

Can it be said in that state of the statute that whether facilities are local is not relevant to this case? The Court of Appeals in returning an affirmative answer to this question noted that "There is a superficial inconsistency" between its position and the last quoted provision of the Act. But it said that we, in *Jersey Central Power & Light Co.* v. *Federal Power Commission*, 319 U. S. 61, held this "limitation" "not to apply to the sections of the Act which specifically give the Federal Power Commission jurisdiction over matters of financial arrangements, such as the accounting section which we are discussing here." This misapprehends our holding in the *Jersey Central* case. The line did not cross state borders and since it was wholly within one state, it was contended that the line was used for intrastate transmission and that the Act did not apply although the line was used to transmit power in its course of exportation from the State. We denied this contention and said, "It is impossible for us to conclude that this definition means less than it says and applies only to the energy at the instant it crosses the state line and so only to the facilities which cross the line and only to the company which owns the facilities which cross the line. The purpose of this act was primarily to regulate the rates and charges of the interstate energy. If intervening companies might purchase from producers in the state of production, free of federal control, cost would be fixed prior to the incidence of federal regulation and federal rate control would be substantially impaired, if not rendered futile." 319 U. S. at 71-72. We held that the "primary purpose" of the 1935 amendments to the power Act was to give the Power Commission control of sales of energy across state lines which had been held to be beyond the control of the state of export in *Public Utilities Commission* v. *Attleboro Steam & Electric Co.*, 273 U. S. 83. Here, however, the federal authority to fix the sale price of the energy coming from Massachusetts in interstate commerce attaches and presumably has been or at least may be exercised pursuant to the *Jersey Central* holding before the energy reaches this company. What petitioner does or fails to do is only after the incidence of federal regulation and can in no way frustrate it.

In the *Jersey Central* case on consideration of its facts we said, "We conclude, therefore, that Jersey Central is a public utility under this act." 319 U. S. at 73. Such a finding made the provisions of the Act apply to it. But the Company contended, notwithstanding its status as a public utility, that it was carried out of that particular federal regulation by the fact that the state regulated its security issues. We held that state regulation does not operate to exempt from the security provisions a company otherwise subject to the Commission's jurisdiction but that "The sounder conclusion, it seems to us, is that this limitation is directed at generation, transmission and sale rather than the corporate financial arrangements of the utilities engaged in such production and distribution." *Id.* at 74-75. In other words, the policy admonition is to be heeded in determining whether particular facilities make their owner a "public utility" rather than in exempting from specific regulatory provisions a company found to be a public utility. The *Jersey Central* case does not read the policy declaration out of the Act as the court below assumed it to do.

Legislative history is illuminating as to the congressional purpose in putting these provisions into the Act. As frequently is the case, this original bill was drafted by the counsel and aides of the agency concerned.[2] In its support Commissioner Seavey of the Federal Power Commission said to the House Committee, "The new title II of the act is designed to secure coordination on a regional scale of the Nation's power resources and to fill the gap in the present State regulation of electric utilities. It is conceived entirely as a supplement to, and not as a substitution for State regulation."[3] Progress of the bill through various stages shows constant purpose to protect rather than to supervise authority of the states. In reporting a revised bill to the Senate the Committee on Interstate Commerce said, "Subsection (a) . . . declares the policy of Congress to extend that regulation to those matters which cannot be regulated by the States and to assist the States in the exercise of their regulatory powers, but not to impair or diminish the powers of any State commission."[4] The Report of the House Committee on Interstate and

[2] Hearings, Senate Committee on Interstate Commerce on S. 1725, 74th Cong., 1st Sess., 223.

[3] Hearings on H. R. 5423, House Committee on Interstate and Foreign Commerce, 74th Cong., 1st Sess., 384.

[4] Sen. Rep. No. 621, 74th Cong., 1st Sess.

Foreign Commerce in presenting the amended bill called attention to *Public Service Commission* v. *Attleboro Steam & Electric Co.*, 273 U. S. 83, holding that rates charged in interstate wholesale transactions may not be regulated constitutionally by the states, and expressed the purpose to give federal jurisdiction to regulate rates of wholesale transactions, but not to give jurisdiction over local rates. It said:

"The bill takes no authority from State commissions and contains provisions authorizing the Federal Commission to aid the State commissions in their efforts to ascertain and fix reasonable charges. . . . The new parts are so drawn as to be a complement to and in no sense a usurpation of State regulatory authority and contain throughout directions to the Federal Power Commission to receive and consider the views of State commissions. Probably, no bill in recent years has so recognized the responsibilities of State regulatory commissions as does title II of this bill."

. . . . . .

"Subsection (b) confers jurisdiction upon the Commission over the transmission of electric energy in interstate commerce and the sale of electric energy at wholesale in interstate commerce, but does not apply to any other sale of electric energy or deprive a State of any lawful authority now exercised over the exportation of hydroelectric energy transmitted out of the State. As in the Senate bill no jurisdiction is given over local distribution of electric energy, and the authority of States to fix local rates is not disturbed even in those cases where the energy is brought in from another State."[5]

If we consider the professions of the sponsors of this bill to have been in good faith, where are we to find them written into the Act?

The policy declaration that federal regulation is "to extend only to those matters which are not subject to regulation by the States" is one of great generality. It cannot nullify a clear and specific grant of jurisdiction, even if the particular grant seems inconsistent with the broadly expressed purpose. But such a declaration is relevant and entitled to respect as a guide in resolving any ambiguity or indefiniteness in the specific provisions which purport to carry out its intent. It cannot be wholly ignored.

The declared purpose might also be looked for in specific denials of power to the Commission, such as that found in § 204(f), which provides that its controls, relating to issuance of securities,

[5] H. R. Rep. No. 1318, 74th Cong., 1st Sess., 7, 8, 27.

shall not extend to a public utility operating in a state under the laws of which its securities are regulated by a state commission. But such exemptions from particular regulations apply only to companies found in general to be subject to federal regulation and do not protect the state's general control over its local utilities.

The assurance which the sponsors of this legislation expressed as to protection of the general jurisdiction of a state over electric utilities of this character either is not given effect by this Act at all, or it is to be found in the words of § 201(b), "but shall not have jurisdiction, except as specifically provided in this Part and the Part next following, . . . over facilities used in local distribution . . . ." The court below, following a statement in *Hartford Electric Light Co.* v. *Federal Power Commission*, 131 F. 2d 953 (C. C. A. 2d, 1942), held that this "but" clause "is intended to make it clear that this jurisdiction extends even to local facilities where the Act provides for their regulation, as it does in the case of accounting practices." This seems to get the cart before the horse, for whether the Act provides for such regulation depends on whether the facilities are under the jurisdiction of the Commission; the Commission's jurisdiction does not depend on some independent application of the regulatory provisions. But the cited decision, pointing out that one of the several types of facilities mentioned as exempt in the "but" clause, i. e., those "used *only* for transmission in intrastate commerce," could not possibly be used for interstate transmission, rejected the whole provision to avoid a "foolish interpretation." It concluded, "The 'but' clause then shows up not as one reducing jurisdiction but as a negatively worded confirmation of the Commission's jurisdiction, in certain circumstances, over the facilities mentioned in the 'but' clause."[6] The Commission takes much the same position here.

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[6] The statement was not decisive of the result, which rested on an alternative ground; and the court did recognize need for the further step of finding that the generating facilities were used as facilities for interstate wholesale sales, and therefore were within § 201(b). The court below failed expressly to find existence of jurisdictional facilities under § 201(b). The quoted statement reads in full:

"Moreover, among the facilities described in the 'but' clause of § 201(b), are those used 'only for the transmission . . . in intrastate commerce'; as such facilities could not possibly be among those used for interstate transmission or interstate wholesale sales, the 'but' clause becomes foolish if interpreted as carving out of the authority granted in the earlier part of the

It is hard for us to believe that Congress meant us to read "shall have jurisdiction" where it had carefully written "but shall not have jurisdiction." The command "thou shalt not" is usually rendered as to forbid and we think here it was employed without subtlety or contortion and in its usual sense. If otherwise in doubt this provision should be read in harmony with the policy provision. So read its terms seem plainly to state circumstances under which the Commission shall not have jurisdiction. As such it is the provision which loomed importantly in the minds and speech of its sponsors, perhaps was necessary to get the bill passed, and is one which the Commission must observe and the courts must enforce.

This bill came before Congress as prepared by the staff of the Commission, couched largely in the technical language of the electric art. Federal jurisdiction was to follow the flow of electric energy, an engineering and scientific, rather than a legalistic or governmental test. Technology of the business is such that if any part of a supply of electric energy comes from outside of a state it is, or may be, present in every connected distribution facility. Every facility from generator to the appliance for consumption may thus be called one for transmitting such interstate power. By this test the cord from a light plug to a toaster on the breakfast table is a facility for transmission of interstate energy if any part of the load is generated without the state. It has never been questioned that technologically generation, transmission, distribution and consumption are so fused and interdependent that the whole enterprise is within the reach of the commerce power of Congress, either on the basis that it is, or that it affects, interstate commerce, if at any point it crosses a state line. Such a broad and undivided base for jurisdiction of the Power Commission would be quite unobjectionable and perhaps highly salutary if the United States were a unitary government and the

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same sentence the facilities described in the 'but' clause. Such a foolish interpretation is avoided by giving effect to a pause in the 'but' clause, i. e., 'except as specifically provided in this Part or the Part next following [sections 824-824r of this title].' The 'but' clause then shows up not as one reducing jurisdiction but as a negatively worded confirmation of the Commission's jurisdiction, in certain circumstances, over the facilities mentioned in the 'but' clause. In other words, the 'but' clause is to be construed as if it read: 'Wherever it is so specifically provided in Parts II and III, the Commission shall have jurisdiction over the facilities used for generation, for local distribution, for intrastate transmission, etc.'" Hartford Electric Light Co. v. Federal Power Commission, 131 F. 2d 953, 962.

only conflicting interests to be considered were those of the regulated company.

But state lines and boundaries cut across and subdivide what scientifically or economically viewed may be a single enterprise. Congress is acutely aware of the existence and vitality of these state governments. It sometimes is moved to respect state rights and local institutions even when some degree of efficiency of a federal plan is thereby sacrificed. Congress may think it expedient to avoid clashes between state and federal officials in administering an act such as we have here. Conflicts which lead state officials to stand shoulder to shoulder with private corporations making common cause of resistance to federal authority may be thought to be prejudicial to the ends sought by an act and regulation more likely to be successful, even though more limited, if it has local support. Congress may think complete centralization of control of the electric industry likely to overtax administrative capacity of a federal commission. It may, too, think it wise to keep the hand of state regulatory bodies in this business, for the "insulated chambers of the states" are still laboratories where many lessons in regulation may be learned by trial and error on a small scale without involving a whole national industry in every experiment.

But whatever reason or combination of reasons led Congress to put the provision in the Act, we think it meant what it said by the words "but shall not have jurisdiction, except as specifically provided in this Part or the Part next following . . . over facilities used in local distribution." Congress by these terms plainly was trying to reconcile the claims of federal and of local authorities and to apportion federal and state jurisdiction over the industry. To define the scope of state controls, Congress employed terms of limitation perhaps less scientific, less precise, less definite than the terms of the grant of federal power. The expression "facilities used for local distribution" is one of relative generality. But as used in this Act it is not a meaningless generality in the light of our history and the structure of our government. We hold the phrase to be a limitation on jurisdiction and a legal standard that must be given effect in this case in addition to the technological transmission test.

Nor do we think the exemption of "facilities used for local distribution" exempts only those which do not carry any trace

of out-of-state energy. Congress has said without qualification that the Commission shall not, unless specifically authorized elsewhere in the Act, have jurisdiction "over facilities used in local distribution." To construe this as meaning that, even if local, facilities come under jurisdiction of the Federal Commission because power from out of state, however trifling, comes into the system, would nullify the exemption and as a practical matter would transfer to federal jurisdiction the regulation of many local companies that we think Congress intended to leave in state control. It does not seem important whether out-of-state energy gets into local distribution facilities. They may carry no energy except extra-state energy and still be exempt under the Act. The test is whether they are local distribution facilities. There is no specific provision for federal jurisdiction over accounting except as to "public utilities." The order must stand or fall on whether this company owned facilities that were used in transmission of interstate power and which were not facilities used in local distribution.

Since the Court of Appeals considered irrelevant the jurisdictional test which we find to be imposed by Congress, the inquiry on review has not proceeded under a correct rule of law and it follows that the judgment of the Court of Appeals must be reversed.

Whether the Commission's decision was reached under the same misapprehension of the law of its jurisdiction is not made so clear from its findings or opinion. Of course under the Act "The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive." § 313(b). The Commission has found that each of the facilities in question is "used for the transmission of electric energy purchased as aforesaid from the Connecticut Power Company, as distinguished from local distribution thereof." It has not, however, made an explicit finding that these facilities are not used in local distribution and we are in doubt whether by application of the statute as herein construed it could have done so. We have said, and it is applicable to this case, that "Where a federal agency is authorized to invoke an overriding federal power except in certain prescribed situations and then to leave the problem to traditional state control, the existence of federal authority to act should appear affirmatively and not rest on inference alone." *Yonkers* v. *United States*, 320

U. S. 685, 692; *Florida* v. *United States*, 282 U. S. 194, 211-12; cf. *Palmer* v. *Massachusetts*, 308 U. S. 79, 84; *Federal Trade Commission* v. *Bunte Bros.*, 312 U. S. 349, 351. Nothing except explicit findings excluding the grounds of state control gives assurance that the bounds of federal jurisdiction have been accurately understood and fully respected, and that state power has been considerately and deliberately overlapped.

The findings and opinion of the Commission leave us in doubt, to say the least, as to whether what we consider limitations on the jurisdiction of the Commission were so considered by it. The only specific reference to the subject is the statement that "Respondent's contentions that it is subject to regulation by the Public Utilities Commission of the State of Connecticut and therefore not subject to the regulation provided by the Federal Power Act must be rejected," citing *Northwestern Electric Company* v. *Federal Power Commission*, 125 F. 2d 882, and *In the Matter of The Hartford Electric Light Company*, 2 F. P. C. 502, aff'd, 131 F. 2d 953. In both of those cases factual differences in reference to the status of the company as a public utility were involved, and we agree with the Commission that once a company is properly found to be a "public utility" under the Act the fact that a local commission may also have regulatory power does not preclude exercise of the Commission's functions. Cf. *Northwestern Electric Co.* v. *Federal Power Commission*, 321 U. S. 119. But such a rejection of state control as grounds of exemption must be preceded by the finding, giving due weight to the policy declaration in doubtful cases, that the company in question is a "public utility" by reason of ownership of facilities not used in local distribution.

In determining this the Commission announced and applied a rule which appears to be one of law as to interstate transmission: "Such transmission, in our opinion, extends from the generator, where generation is complete [citing *Utah Power & Light Co.* v. *Pfost*, 286 U. S. 165, 181] to the point where the function of conveyance in bulk over a distance, which is the essential characteristic of 'transmission', is completed and the process of subdividing the energy to serve ultimate consumers, which is the characteristic of 'local distribution', is begun [citing *Southern Gas Corporation* v. *Alabama*, 301 U. S. 148, 155, and *East Ohio Gas Co.* v. *Tax Commission*, 283 U. S. 465, 471]."

The *Southern* and *East Ohio* cases both involved natural gas transportation into a state and sales of gas at retail therein. Each was a tax case in which the state asserted that the sales within the state constituted an intrastate business which in one case would support a state levy of an annual franchise tax based on the actual amount of capital employed in the state; and in the other, an excise tax based on gross receipts from the business within the state. The companies each contended that sales made to consumers within the state were still within interstate commerce and hence there was no state jurisdiction to tax. In neither case was this Court required to determine the exact point at which interstate commerce ceased and intrastate commenced. It was required to find only some "doing of business" within the state in order to sustain the constitutionality of the statutes involved. In both cases it upheld the power of the state to tax and in both held that the distribution at low pressure was a local business for taxation purposes as distinguished from transmission in interstate commerce. But a holding that distributing gas at low pressure to consumers is a local business is not a holding that the process of reducing it from high to low pressure is not also part of such local business. In so far as the Commission found in these cases a rule of law which excluded from the business of local distribution, the process of reducing energy from high to low voltage in subdividing it to serve ultimate consumers, the Commission has misread the decisions of this Court. No such rule of law has been laid down.

But for such an erroneous view of the law established by our decisions it seems doubtful if the Commission would have reached the conclusion that it did upon this record. Nor is it clear that if it were reached it would be supported by substantial evidence. Expert testimony received by the Commission on the subject from the Commission's own experts seems to have been predicated upon the Commission's understanding of the law. It is not for us to make an original appraisal of the facts. We do not therefore undertake to decide as an original matter whether the facilities in question are or are not facilities which can subject the Company to the act.

Nor do we undertake to pass upon the contention of the Government that even if the present facilities do not constitute a sufficient basis for federal jurisdiction the operation of other

facilities since abandoned subjects the company to the accounting order of the Commission for the period of January 1, 1937, when it became effective, until June 1, 1941 or some other date, depending on the facility found to be the basis of jurisdiction. The Company contends that to make it install an expensive system of accounting for a period that was short and has already expired would be a mere waste of time and money and would be of no practical benefit. The Commission contends that the accounting requirements and information would tend to discourage further write-ups and inflation of accounts and would amount to "regulation by the informatory process." It contends that this company has been guilty of accounting abuses in the nature of write-ups and the creation of fictitious surpluses which would be eliminated or at least discouraged by an application of its uniform system of accounts. The Company denies that such abuses exist. It is not, however, contended that Congress has conferred any jurisdiction upon the Commission to reach accounting abuses when and if they exist except as to companies which own facilities subject to the jurisdiction of the Commission. In other companies the correction of these abuses, if they exist, is left to the state government, which has this company completely within its power and whose constituents are the sufferers by any abuses that may exist. We will not undertake to make an original finding as to jurisdiction for a period, any more than as to jurisdiction at the present time.

Another contention made by the Company may be shortly disposed of. It is contended that the volume of energy passing over certain of these facilities is insignificant in proportion to the total. Only about one-fifth of one per cent of all the energy received and generated by the Company throughout the State of Connecticut was transmitted out of the state during the time of the connection of Fishers Island with the Borough of Groton. Congress appears to have left to the Commission's sound administrative discretion to determine whether or not to assert its authority in such situations. Congress annually receives a report of the Commission's work and appropriates the funds for its continuance. If it thinks the Commission is over-extending its attention to trivial situations it has ready means of control in its hands. The wisdom of its work is not our concern, but only its legal justification. We do not find that Congress has conditioned

the jurisdiction of the Commission upon any particular volume or proportion of interstate energy involved, and we do not think it would be appropriate to supply such a jurisdictional limitation by construction.

For the reasons stated, the judgment of the Court of Appeals is reversed with instructions to remand the cause to the Federal Power Commission for further proceedings consistent with this opinion.

Reversed.

Mr. Justice RUTLEDGE concurs in the result.

Mr. Justice MURPHY, dissenting.

The findings and opinion of the Federal Power Commission in this case make clear that they are substantially and reasonably rooted in fact and law and that proper respect has been shown for jurisdictional limitations. Remand of the case to the Commission for further consideration thus can only serve to produce needless delay and to force the Commission to make certain minor and unnecessary changes in its written opinion. Cf. dissenting opinion in *Securities and Exchange Commission* v. *Chenery Corp.*, 318 U. S. 80, 95.

The basic jurisdictional fact necessary to sustain the imposition on petitioner of the Commission's accounting standards is that petitioner be a public utility within the meaning of the Federal Power Act. In the setting of this case petitioner must thus be found to own or operate facilities for the "transmission of electric energy in interstate commerce." § 201(b). Nowhere in the Act has Congress defined "transmission" or "facilities" other than to say in § 201(c) that "electric energy shall be held to be transmitted in interstate commerce if transmitted from a State and consumed at any point outside thereof." The Commission therefore has the duty in the first instance of interpreting and applying these terms to the factual situation confronting it. A court's function in reviewing this jurisdictional determination is necessarily limited to ascertaining whether that determination has warrant in the record and a reasonable basis in law, giving due weight to the fact that the Commission is an expert body designated by Congress and specially equipped to grapple with the

highly technical problems arising in this field. *National Labor Relations Board* v. *Hearst Publications*, 322 U. S. 111, 130, 131.

The Commission here has found that petitioner owns and operates an electric utility system in the state of Connecticut. It is undisputed that electric energy generated in Massachusetts is transmitted over the wires of other companies to petitioner's facilities at Bristol, Connecticut. In order to transmit power economically for such a long distance, it is necessary to raise the voltage and reduce the current in Massachusetts as the energy starts its interstate journey. But the high voltage needed for transit purposes cannot be utilized by consumers. It therefore is necessary to employ apparatus at the receiving end of the interstate transmission to lower the voltage. Petitioner accordingly maintains step-down transformers and substation facilities at Bristol for that purpose. After the voltage is lowered, the energy is subdivided and distributed over petitioner's wires to consumers in and around Bristol.

The Commission concluded that the functions of the Bristol step-down transformers and substation facilities constitute transmission of energy in interstate commerce since it felt that, in its opinion, such transmission "extends from the generator, where generation is complete, to the point where the function of conveyance in bulk over a distance, which is the essential characteristic of 'transmission', is completed and the process of subdividing the energy to serve ultimate consumers, which is the characteristic of 'local distribution,' is begun." In other words, the Commission viewed the interstate transmission as complete only after the energy is converted back into a form suitable for local distribution and use and the facilities used for such conversion purposes are necessarily facilities for interstate transmission.

The jurisdictional determination of the Commission must therefore stand or fall upon the validity of its analysis of when long-distance transmission of electrical energy across state lines is at an end. Only if we can point to an absence of any substantial evidence to support the Commission's view or if we can find legal or statutory principles compelling the opposite view can we justifiably say that the Commission had no jurisdiction in this case or that remand should be made to the Commission for further proceedings. But the Commission's view cannot be undermined on either basis and it should therefore be affirmed.

Certainly there is ample testimony in this case by engineers to the effect that the Bristol substation equipment constitutes "facilities for transmission of electric energy in interstate commerce," as distinguished from "facilities used in local distribution." And the very fact that the Commission, with all its accumulated wisdom and experience, is of the opinion that interstate transmission ceases only after the transmitted energy has been converted into a form suitable for local distribution and use is not without weight and significance.

From a legal standpoint, the Commission made no plain error. Clearly no opinion in this Court has purported to decide at what precise point interstate transmission of electrical energy ends and local distribution commences. This seems to be a novel point insofar as legal precedent is concerned. The Commission's conclusion in this respect hardly seems so unreasonable and unsound as to require us to hold, as a matter of law, that interstate transmission ends just before the voltage is decreased. And this Court does not pretend so to hold in this case.

The Court criticizes the Commission and remands the case to it, however, mainly because it cited *Southern Gas Corp.* v. *Alabama*, 301 U. S. 148, 155, and *East Ohio Gas Co.* v. *Tax Commission*, 283 U. S. 465, 471, in a footnote in support of its proposition that interstate transmission ends only after the energy is converted back into a form suitable for local distribution. It is said that the Commission erroneously assumed that those cases set forth a rule of law which excluded the process of reducing energy from high to low voltage in subdividing it to serve ultimate consumers from the business of local distribution. But even assuming that these two cases do not enunciate such a rule and do not directly support the Commission's proposition, it does not follow that the Commission committed reversible error by citing them in a footnote. The Commission's proposition was grounded not on these two cases but upon the testimony in the record and its own knowledge and experience pertaining to electrical transmission. This is plainly revealed by the use of the phrase "in our opinion" in the sentence setting forth the Commission's distinction between interstate transmission and local distribution. The slight reference to the *Southern Gas* and *East Ohio* cases was at most for purposes of analogy and cannot serve to impair the true underlying basis of the Commission's proposition. Presumably all the Commission need do on remand in this respect is to remove the foot-

note reference to these cases—a fact that makes obvious the proposition that more than an irrelevant or even erroneous citation of a case should be required before we are justified in reversing an administrative determination and sending it back for further consideration.

The Court also deals at great length with the policy declaration in § 201(a) of the Act that federal regulation is "to extend only to those matters which are not subject to regulation by the States" and with the "but" clause in § 201(b), which states that the Commission shall not have jurisdiction, except as specially provided, over certain facilities, including those used in local distribution. But neither of these provisions is controlling in this case where the Commission has made a clear and supportable finding that petitioner is a public utility within the meaning of the Act and where the only federal regulation sought to be imposed is the accounting requirements of § 301(a).

It may be conceded that this Court in *Jersey Central Co.* v. *Federal Power Commission*, 319 U. S. 61, did not read out of the Act the policy declaration in § 201(a). But it did make clear that the declaration, which speaks solely in terms of "regulation," was directed solely at proposed federal regulation of the generation, transmission and sale of electric energy rather than at proposed federal regulation of the corporate financial arrangements of utilities, such as their accounting methods. 319 U. S. at 74, 75. Congress did not intend, in other words, to intrude upon state regulation of generation, transmission and sale of energy but it did intend to impose financial regulations on public utilities engaged in interstate transmission of energy even though states might also impose financial regulations. This means, under the facts of this case, that interstate transmission of energy is a proper test of whether federal accounting standards may be imposed. What sort of transmission may be a proper subject of federal regulation in and of itself if the State of Connecticut already regulates the transmission facilities is not in issue. The Commission clearly did not misconceive the meaning of this policy declaration and, in light of this Court's opinion, it apparently need do no more than spell out its recognition of the scope and present inapplicability of the declaration.

Nor did the Commission do violence to the "but" clause of § 201(b). Here the Commission, following the rule stated in the *Jersey Central* case, 319 U. S. at 73, that "the determinative fact

is the ownership of facilities used in transmission," has found that petitioner is a public utility since it owns and operates facilities used in interstate transmission of energy. The Commission thus has jurisdiction over petitioner for accounting purposes. The denial of jurisdiction in the "but" clause where facilities are used for transmission of energy in local commerce has no relevance in this case, an obvious fact which the Commission apparently now must make explicit on remand.

The Commission is dealing here with a difficult marginal case. The precise dividing line between interstate transmission and local distribution can only be drawn by those familiar with the engineering and electrical problems involved. The problem in this case, moreover, is a relatively unique one. An informal survey by the Commission has shown that out of a total of about 1,000 privately-owned electric utilities there are only 12 which own or operate step-down substation facilities for taking out-of-state energy and which would not otherwise be public utilities under the Act. The problem is thus one peculiarly within the competence of the Commission, which has shown no desire to use the principle it has enunciated in this case and could not use it as a vehicle for assuming unjustified jurisdiction over the facilities of all the local distributing companies in the nation. It has given proper respect to the dictates of Congress relative to state regulation. We should therefore affirm its action in this case without burdening it with requirements of artistic refinement and of negations of the applicability of irrelevant statutory provisions.

Mr. Justice BLACK and Mr. Justice REED join in this dissent.